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Abstract

Spillover effects of military training and service on vocational, employment, and educational activity were investigated. Interviewees, consisting of 2,313 Army veterans and 1,084 Navy veterans, were surveyed by questionnaire as to personal and socioeconomic background (including aptitude and education), military occupational specialities (MOSs), preservice and subsequent employment, patterns of job seeking, success or failure in finding training related employment, and barriers to the use of military experiences. Related civilian occupations were recorded for each MOS. These were among the major findings: (1) only 15.9% of Army veterans and 28% of Navy veterans used their military skills in civilian life; (2) the labor market did not effectively aid veterans interested in using their service experience; (3) preservice employment dominated postservice occupational choice; (4) Navy veterans were more likely than Army veterans to return to school. (The document includes job descriptions, an estimation of the military contribution of human capital, a study of problems in measuring transfer of training, the role of the military in economic development, and implications of veterans' activities.) (ly)

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LABOR MARKET ACTIVITY OF VETERANS: SOME ASPECTS OF MILITARY SPILLOVER

Project No. 6-2198
Grant No. OEG2-6-062198-1955

Paul A. Weinstein

August 1969

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Department of Economics
University of Maryland

College Park, Maryland

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Final Report of the
MILITARY TRAINING STUDY
University of Maryland
Department of Economics

LABOR MARKET ACTIVITY OF VETERANS:
SOME ASPECTS OF MILITARY SPILLOVER

Director

Paul A. Weinstein

June 1969

ACKNOWLEDGMENTS

The Military Training Study received the support, encouragement, cooperation, and stimulation of many individuals and institutions. The initial impulse to my undertaking the project was the conversation of Mrs. Anna Brown with my wife about the training programs in the military. Professor Eli Ginzburg shared his thoughts and experience on military training. His advice and involvement helped launch the study.

At the initial stages, and later in examining the Navy experience, Mr. Richard Beaumont, President of Industrial Relations Counselors and former Assistant Secretary of the Navy for Manpower, supplied aid in every form. Since there was a need to be in Washington during the planning of the program, the Brookings Institution gave me valuable space while Ralph Halford, Dean of the Graduate Faculties of Columbia University supported the effort spiritually and financially.

Working up the procedures required the cooperation of a number of federal agencies. A necessary input was the support given by the Department of Defense. Mr. William Gorham, then Deputy Assistant Secretary of Defense, and members of his staff - Robert Steffes, Worth Bateman, Harold Wool, and Colonel Gorman Smith - helped prepare

contacts and supplied useful criticism of the design. The sufficient inputs came from the services themselves. Especially helpful were Frank McKernan and William Kelly of the Army Office of Personnel Operation. The Training Directorate at Fort Monroe, Virginia and the Records Center in St. Louis deserve particular note. In the Navy, Mark Beigle and Dr. Sidney Freidman were instrumental along with many parts of the Bureau of Naval Personnel. The Air Force was excluded only after considerable study of Air Force operations. Lt. Colonel Frank McLanathan and the men in the training directorate at Randolph Air Force Base and at the Personnel Research Laboratory at Lackland Air Force Base offered considerable aid.

The focus of the research on post-service experience required vehicles for pursuing veterans. Following up ex-servicemen was a difficult problem, but one helped substantially by General Lewis B. Hershey of the Selective Service and members of his staff, particularly Dr. Kenneth McGill and Colonel Omer.

The financial needs of a study involving direct interviewing are both enormous and difficult to estimate. We were fortunate to receive aid from a number of sources. The Ford Foundation was the initial financial support for the Study. As it developed, it became evident that the initial funding was insufficient. The U.S. Office of Education was interested in the Study and gave us additional financial support which was used to broaden the scope of the study in the direction of the Office of Education's mission. The computer time for this project was made available through the facilities of the Computer Science Center at the University of Maryland. In addition, the Office of Economic Opportunity, through its College Work-Study Program, helped underwrite some direct costs of the Study.

These resources helped support a staff of dedicated graduate and undergraduate students. Of principal assistance in designing and helping to carry out the work in the Army was Dr. Eugene Jurkowitz, now of the Standard Oil Company of New Jersey. Working on the Navy experience and supporting the Study above and beyond the call of duty, was Mr. William B. Clatanoff, Jr. Mr. Clatanoff's forthcoming doctoral dissertation at the University of Maryland will explore some of the income and crossover effects which emerged from the Navy survey. Also aiding as graduate assistants were Richard Wertheimer and Elaine Greenbaum.

A number of undergraduates both at Columbia and the University of Maryland were of great help in many aspects of this study, from coding to carrying on small library research projects. These undergraduates were Jacob Benus, Lance Couturier, R. Collier Cropp, Mark Daniel, Kenly Drummond,

Monica Gabor, Donna Hardesty, Sarah Holstein, Robert Horowitz, Jackie Jennings, Marlene Korth, Joseph Krieger, Richard Leeds, David Lesher, Dennis Levinson, Myron Melnikoff, Joseph Regan, Marc Rochkind, Lauren Rudd, Albert Seivold, Ronald Surdin, and William Werner.

My secretary helping to complete this study has been Sharon Meiselman. She typed, edited, carried on the business operations of the Study, and all this while an undergraduate at the University of Maryland. Assisting her were Carole Glenn, Eileen Atkins, and Priscilla Wallace. Prior to Miss Meiselman I was aided by Janet Edmondson and by Barbara Baer at Columbia. Of great service in editing the final draft of the Study was Ruth Thomas.

It would be totally inappropriate not to mention the support and assistance which I have received from my family. As anyone who has worked on a study of this size and length knows, the sacrifice paid in being away from his family is great; and I hope that this work will be a minor recompense to my two children. To my wife, Alice, I can express in no way my deep gratitude for her patience, understanding, and for her encouragement. In addition to this spiritual support, she aided in editing of the manuscript, and without her this study could not have been completed.

P.A.W.

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Chapter I

RESEARCH OBJECTIVES

Public officials perceive they have no way of comparing the relative importance of military and civilian training programs. This was highlighted in Congressional hearings concerning the military by Joseph Califano, former White House Aide. While discussing this failing he characterized the relation of the military and civilian programs as one of pure competition. No linkages are seen between these two resource using sectors.

Counterposed to this argument is that the military has sizeable and positive effects on the civilian sector. One dimension of this is that they train men for specific jobs and, more importantly, for the "world of work."

This intermittent dispute on the impact of the military reached a critical point with the release of the "One Third of a Nation" study. This report was deeply rooted in the structuralist philosophy on umemployment. Pointing to the spectacular numbers of young men unable to serve in the military, it indicated that these potential long term unemployables would benefit by some special programs. Neighborhood Youth Corps and Job Corps were introduced as a civilian response, while Operation 100,000 and Project Transition came about as a result of military initiative. Despite these experiments we have gone only a little way in identifying the success of the programs or the actual or potential interrelations between them.

This study is a move toward filling this void by exploring and making explicit the spillover effects of the military on vocational, employment, and educational activity. The development of relations along the lines of training use, career movement, and education specified here is a useful foundation for vocational education and human resource programs linking the military and non-military sectors. No systematic attempt has previously been made to evaluate the military with reference to manpower. In the past scholars have failed to assess the military impact on either the stock of general or of specific human capital.[1] Efforts have been meager in evaluating the relative achievement of the non-military to the military as a guide to integrated manpower policy. The government has frequently pursued independent military, civilian, and public sector manpower policies, which are sometimes in conflict.

An examination of the military establishment from the human capital perspective is fruitful for suggesting civilian policy alternatives. The military faces problems of career development for its own needs while necessarily altering tastes, knowledge, education, and experience of those who enter the services. An individual is affected by serving in terms of the pure military discipline and experience he receives as well as the direct vocational experience. He is also forestalled from pursuing his civilian life. This may have mixed effects, but ones which we shall seek to disclose.

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[1] This study is part of the research interest of economists in investment in human resources. The capital concept applied to humans is non-normative. General capital refers to investments that have wide payoffs, i.e. in many activities, specific capital is associated with the firm-agent making the investment. For a more detailed analysis see: Gary S. Becker, Human Capital, (National Bureau of Economic Research, N.Y.) 1964. Distinctions relating to the military are presented in Chapter IV.

In meeting its own manpower needs, the military has developed institutions and techniques of training, screening, and evaluating his manpower program. It has done this by using its own internal personnel systems as well as the skills of both industry and the academic. One of the most striking characteristics of the military manpower operation is the continuous attempt to upgrade its management techniques against a matrix of increasingly sophisticated technology.

Our knowledge of this military activity is only peripheral. For many reasons, the military has been treated as an institution separate from the mainstream of the economy. Therefore, it has developed without an observable record of what it has done and potentially what it might do.

This study examines the supply of trained individuals to the non-military sector and, indirectly, the demand in that sector for individuals with specific training. The returns to this research radiate in a number of directions. How had military training been used? How may a better bridge be created between the training-work experience in the military and the requirements in the non-military? What barriers to transferability of the training exist? Is it feasible and/or desirable to erode these barriers, or, alternatively, eliminate transfer and utilization of military training as a fruitful avenue of scholarship and research? Has the military aided the disadvantaged? Is the impact uniform across the country?

The training for occupations and the actual work experience in the military is diverse across service lines and nowhere is co-extensive with the non-military. The primary mission of the military and the necessary cleavage between the military and non-military are parameters for both research and action. Currently, the extent of the past impact and the policy potentials are conjectural. This research transfers this problem area from that domain and establishes it on a systematic quantitative and theoretical basis.

Chapter II

RESEARCH DESIGN AND POLICY PROBLEMS

The research focused on an estimation of the investment of specific human capital by the military in males.[2] Concentrating on specific investment led us to examine the military as a trainer separate from its role as an educator, disciplinarian, and an environment in which men age. While each of these factors is important and has a conceptual and measurable economic impact, this study separated the issues and populations on grounds which appeared significant for policy problems: to see if the military could be used to meet needed civilian shortages in critical skills as well as directly benefiting those who have completed service. Two alternative research strategies associated with these objectives point up some of the design problems attendant to measuring the military's impact.

Design

It is possible to partition all the men from a recognized geographic area who went through the service, or who went into the service and remained until retirement. The behavior and/or activities of these men could be compared with men from the same area who did not go through the military to see if they differ significantly in any interesting dimensions. This unaccepted design would focus on the 'military' effect,[3] treating the military experience as largely homogeneous for study purposes. The civilian group and experience would also be assumed homogeneous. Then one could see how unemployment or education demand might vary between the two groups. Another advantageous aspect of this design is that the subjects would be of the same age. Members of both sample groups would age simultaneously and, therefore, the observable differences would refer to service life as opposed to the effect of just aging or maturing. Assuming that significant differences between the groups emerged, that is, rejecting the null hypothesis of group similarity, one is left with the problem of determining causation. And further, policy decisions to alter the patterns in a desired fashion need to be made.

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[2] The decision to limit the study to males was a first level decision. It would be useful to study females, particularly if the concept of universal service irrespective of sex achieved stronger support. Errors of various types resulted in females appearing in the sample. We subsequently excluded them.

One dimension of the absence of specification in the groups points up the difficulties with this design. The system of military manpower procurement is diverse in both the number of ways that a man can be placed in service as well as application of standards among draft boards or induction centers. There is no evidence that the deviations in these systems are normally distributed. Second, we also doubt that the military population is the same as the civilian, service experience excluded. The procurement process is selective, with regard to education, aptitude, criminal background, psychological characteristics and other things which are not unrelated to economic performances.[4] Consequently it appeared reasonable that correlations derived from this experiment would have the selection process as the independent variable rather than service experience. While an experiment could be designed along these lines without these difficulties it would take the active participation of the Department of Defense to prepare a useful control group.

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[3] Implicit in the analysis of this section is a budget constraint of reasonable proportions. For example, if the region was the continental U.S. and the sample was enormous, the reservations would not hold.

Alternatively, there is the design that was followed, examining the experience of a group of veterans. This hypothesizes that passage through the service is significant. Two temporal nodes are important in this analysis. First, that men were allowed[5] to serve to a level of competence that was appropriate for our research purposes, i.e. achieved a standard of occupational competence (not drafted or enlisted and immediately discharged); second, the men in service chose not to remain in active service, and presumably felt that the civilian life provided superior opportunities.[6]

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[4] The problem was neatly summarized by Art Buchwald when he suggested that high recivitism is due to the shoddy types who are incarcerated. Ergo, put a better class of people in jail and the institutions would show a superior return. (Washington Post, December 3, 1968).

[5] This is not meant to imply that this was volitional - itself a subject of interest.

This research is a temporally detailed cross-section study. Frequently the literature describes this type of research as a longitudinal study of cohorts. We suggest that this research varies slightly from that technique. A longitudinal study suggests a multi-survey technique, where the identified respondent is interviewed at points through time to see if time has had an impact on some of the variables, or if one variable suggests a specific lagged relationship. Alternatively, panels are established in lieu of single respondents to avoid having the interviewees saturated and so affect the response error. In either case the individuals followed are members of specified groups, i.e. alike in all attributes save the variable being tested.[7] We measured the internal differences in the groups realistically through statistical manipulation.[8] In this study we attempted to combine the best attributes of the longitudinal and cohort techniques at the lowest cost.

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[6] The choice of the actual population group is discussed in Chapter III. Suffice it to say that there are a large number of options. While it might "pay" to do a separate study on each group, to test whether there are significant differences among the groups for research and policy purposes is another and far larger study than this.

[7] In this research the interactions of other variables are explicitly considered, although inter-occupational variation is low, reflecting the assignment process.

[8] For the treatment of this see Appendix E, Doctoral Dissertation by Eugene L. Jurkowitz; and Appendix F, paper presented at the Allied Social Science Meetings, December 1967.

Data Sources

To examine the spillover effects of the military with the intent of drawing specific policy suggestions, we had to generate our own data. While the 1960 Census obtained data which could identify veterans, the conceptualization of problems there was well outside our interests. Further, there had been no attempt to develop an analysis of this data by the sponsoring agencies of the Census (Bureau of the Census and Veterans Administration). To date this material has not been explored.

The Department of Defense had a minimal interest in the military's impact on the flow to the civilian sector of specific capital, and ambivalent feelings on their investment history in general human capital. The Draft Study of the Department of Defense, initiated in the controvers over the extension of the Selective Service Act, estimated the cost of a "volunteer army" in a series of non-directed mail surveys conducted by the National Opinion Research Center. The estimation of a supply function focused attention on civilian income. Post-service use of training was not an interest, although they attempted to discover if the service activity was "highly useful," "useful," or "not of use." In carrying out the studies, they did include occupation but the responses were in job titles which was of dubious value.[9]

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[9] Most researchers would agree that the marginal informatio of a job title separate from other data is of exceedingly low value.

The categories of data (see Appendix A and Chapter III) for our problem suggested that a directed interview be undertaken. We chose a single interview spaced long enough after exiting active service to suggest career patterns and motivations. While our technique did not preclude another interview after some time, say to clarify questions raised or to open other areas of inquiry, it did not require more than one interview.

Our focus was on the period after service, but we were concerned with pre-service activity as well as induction and separation. The purpose of this pre-service detail, along with the age at entry, was to specify occupational attachment as an important variable affecting crossover. Two options were open for assembling data relevant to this prolonged time span; including questions on these matters in the interview, or using the respondent's service record. (See Appendix B, Sample Record Folder.) Influencing this choice was our requirement for data on tested aptitude and aspects of military experience.[10] Therefore, we used the recorded data wherever possible in lieu of extending the interview. This choice involved a quality trade-off of unknown dimension. There is reason to suspect an individual's ability to recall events which occurred years before. On the other hand, gaining information from the records is a laborious task and there has been criticism that they are inaccurate.[11] Military regulations state that a serviceman must check his record each year and correct it for error. Given these considerations, we accepted the record as a valid statement despite some mechanical error.[12]

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[10] While the research is directed toward the military, it was reasonable to accumulate data, at a low marginal cost, which would permit research on other topics. For example, it is useful to examine the interaction of education and aptitude.

There are both administrative and technical problems in obtaining records, but these were uncovered after we had made the decision to depend on the record and consider it an extensive separate interview. Despite the difficulties we believe that our dependence on formal records was correct.

Post-service employment experience was a complex problem for substantive and procedural reasons. The factors of location, the duration of employment, and the degree of relatedness between service experience and civilian employment were some of the considerations in determining _ex post_ convergence and the forces that influenced it. Because homogeneity of individual employment experience could not be assured, a maximum of three jobs was considered in the interim; the first post-service job,[13] the current job, and the one preceding the current if different from the others.

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[11] Dr. Albert Biderman of the Bureau of Social Science Research has expressed some misgivings about the reliability of using records.

[12] Even if the recruit gave accurate data it can be garbled in putting it down and again in transferring it to computer form. The Study was obliged to code from records for the Army, but used the Navy Tape Record. Our experience with the Tape Record was not a happy one. The labors of the hand search were rewarded when the tape proved prone to error.

The issue of what veterans did with their occupational skills indicated that we know what civilian occupations were pursued. In past studies, occupation had been difficult to code on the basis of a self-administered questionnaire where the object of post-coding was to assign a D.O.T. or Census occupation code. Considerable experimental testing led to the questions which yielded a D.O.T. number after post-coding.[14] (See questionnaire, Appendix B.)

The use of military training appeared linked to a number of options concerning the use of time. Conceptually it appeared prudent to weight more heavily the experience of a veteran who used his training on both his primary and secondary jobs than in either one but not the other. The clarification of these problems yielded a set of questions that would be useful to this study as well as open the way to more comprehensive analyses of work-leisure preferences. The questions pointed in the direction of moonlighting activity as well as overtime experience on the primary job.

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[13] The first job required additional detail because of its transitional nature: i.e. was it taken until an opening occurred in a career field, or to get money/use up time until school entrance.

[14] The procedural success is in no small way due to Mr. Leon Lewis of the Bureau of Employment Security. Through his aid the questionnaire was developed and the coding carried out. Two code systems appeared to offer merit, Census and D.O T. The interest in matching prior skills to jobs suggested a system that was labor market oriented, rather than one designed for a looser, aggregate accounting of individuals. At the time the study was initiated the new D.O.T. classificatio system was emerging and this study represents an application of that system to research. The reasons for analytic failure of this system are discussed below.

Suspecting that vocational transfer between military and civilian activity would be low, a conclusion in accord with limited earlier studies, it appeared important to appraise the veterans' reasons for non-use of the skills and their estimations of the actual economic value of using the skills. Questions 51 through 58 were developed for this purpose. This series of questions explores the nebulous dimension of how the experience is evaluated and rewarded by employers who use it. In sum, these questions are instruments to convert the notion of ex ante convergence into meaningful economic terms.

It was hypothesized that time was a statistically significant and important independent variable in measuring convergence. The difficulty of going through the period after discharge, to measure actual convergence, required data on the use of time, i.e. in education, unemployment and labor force participation.

Education assumed great importance as a factor in transfer and as an independent variable in producing an economic value for the military experience. The military record provided detail on education up to the point of entry. Education while in service was not accurately and consistently available from the records, but the design of this study and the period of service, the early nineteen-sixties, (with high standards for fitness by the military) did not warrant our using resources to explore it. On the other hand, there was significant reason to explore the post-service education experience. One level was to determine the type of education or formal training, its duration, form and purpose. But on another level we wanted to explore financing the education, including both direct and indirect costs. A third and significant question arose from our hypotheses: Was education sought related to the military training in an attempt to make it more viable? Assuming that the negative would be at least as important as the positive, information on the reasons for not seeking education was desired. If lack of education were a barrier to transfer, could policy be made which might reduce this friction? From this would flow, if warranted, the question of which policy would be the most efficient.

With these broad areas covered, additional background questions on head of household occupation, union status and projected occupations were included in the hope that the data thereby obtained would be useful for future study. The marginal cost of including this material was low enough to warrant it.

Interview Techniques

The subject matter and hypotheses to be explored indicated that a directed interview be undertaken. This was decided in consultation with members of such organizations as: Bureau of Social Science Research, Bureau of Applied Social Research, Survey Research Center, Roper Associates, etc.

Two techniques,[15] telephone and face-to-face interviewing, appeared feasible. Indications were that the population we were dealing with, by age, education, and veteran status, would be reachable by phone. Mobility of the group works against any interview, but especially against a face-to-face technique. The unit cost of interviewing face-to-face is much higher than interviewing by telephone. The essential problem was to determine which technique would be more effective in extracting the necessary information from the respondents.

In testing the telephone technique and in developing the questionnaire which required a directed interview, we received important cooperation from a large institution, Corporation X.[16] Corporation X employs veterans in occupations similar to military occupations. As part of the screening process of job applicants, they obtained information on veteran's status and military occupations, though the latter in relatively unsophisticated form.

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[15] Technical information on the choice is found in Appendix C.

[16] The organization did not wish to be identified. At no time were the individuals in the pretest made aware of how their names were selected for the interview.

The veteran job applicants were divided into two groups, those who had been employed by the firm and those who had not been. A number of steps: primary interview, mental testing, secondary interview, medical examination, etc., were all part of the procedure to obtain employment. It became apparent that men were not hired because the firm did not want them and/or because they did not want the Corporation as an employer. An equal number of hires and non-hires were chosen for the test. They were sent a letter informing them of their being selected for an interview.[17] The personnel records were scrutinized to check the validity of the interviews. When discrepancies appeared, the respondents were called back to clarify the answer. Neither the subject matter nor the length of the interview (approximately 30 minutes) proved an obstacle. Having thus proved the efficiency of the telephone technique in the pre-test, and subsequently finding no reason to doubt its efficiency after following up with selective face-to-face interviews in metropolitan areas, we believe we were justified in using it for the survey.

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[17] The original letter was scrapped as being totally ineffective. Respondents were unable to understand it. The technique of centralized interviewing allowed for immediate correction and validation of material.

Two techniques for telephone interviewing are available. In one, a local interviewer calls locally, i.e. non-long distance, which reduces that direct cost. The other has centralized interviewing using WATS (Wide Area Telephone Service) lines. Discussions with the interviewing firm revealed that they did not have much experience with the locally based survey. In this type of operation there can be little supervision and one depends on the conscientiousness of part-time, relatively low-pay workers. The centralized technique, while marginally more expensive, allows for greater care in the training of interviewers, better control over the interview, technically superior communications, and what proves a useful psychological edge - a long distance call. The respondents, ex post, were flattered by a long distance call and did not terminate the interview when asked about unemployment or income.

To supplement the interview for detail on income, Social Security data were sought. Anyone chosen for the survey would have both an Armed Forces Serial Number and a Social Security Number (mandatory to receive pay at this time). These numbers were used to identify and control data sources, and also opened the possibility of Social Security data. Many difficulties with this data have led to its exclusion from this report, but it stands as a valuable source for future research.

With the questions to be included decided upon, and the alternative methods for assembling the data evaluated, it was essential to deliniate the populations for analysis.

Chapter III

MILITARY ORGANIZATION: CONVERGENCE AND SPILLOVER RESEARCH CHOICES

The purpose of our research was to indicate the extent of actual and potential crossover. As discussed above, this could best be accomplished by following groups of men trained in particular occupations. The hypothesis focused on vocationally oriented attributes that would affect the occupational crossover, assuming a monolithic military. However, observation of the military quickly reveals a diversity of occupations within each service and then among the services. In order to keep the study within reasonable bounds decisions were made: which services to examine, which occupations within each service, and which groups of trained veterans. We believe our decisions were correct, realizing that other options, which would have focused on different questions, were possible.

The Services

The tradition of service independence and separatism is an obstacle that has to be reckoned with in order for any meaningful research to be undertaken and potential policies designed.[18] Mission and technology among the services vary, and, in the development of service esprit these become shields protecting the work of the services. Just as it is almost impossible not to understand an Army manual on occupation, it is almost impossible to comprehend a supposedly parallel document for the Navy. After some study it becomes obvious that such differences are not the result of chance.[19]

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[18] For an example in another area see: Robert J. Art, The TFX Decision, McNamara and the Military. (Boston: Little, Brown and Company) 1958.

The size of the force strength, shown in Table III-1, was the first factor in our selection. The numbers suggest the Army and Air Force as the obvious branches for study, and from the very beginning the Army has been our primary study - first drawn, completed, and reported upon.[20] Other problems with the Air Force led to its exclusion.

The Army is the largest of the services with the highest manpower input and through-put. The make-up of the input is significant. The input flow consists of: conscripts through the Selective Service System; pure enlistees, i.e. men who would have enlisted at the existing relative wages even if there were no likelihood of being drafted, and various

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[19] See Appendix A, Occupational Categories.

[20] Preliminary results of the Military Training Study can be found in Appendix F, "The Military as a Trainer: A Study in Measuring Crossover;" Appendix H, "Regional Implications of Post-Military Activities of Veterans;" "The Military as a Surrogate for Education," prepared for the Annual Meeting of the American Psychological Association, September 1968; and "The Economics of Alternative Uniform Military Procurement Policies," Forensic Quarterly, Vol. 42, No. 3, August 1968.

Table 111-1

Active Duty Military Personnel
(As of June 30)

	Army	Air Force	Navy
1961	858,622	821,151	627,089
1962	1,066,404	884,025	666,428
1963	975,916	869,431	664,647
1964	973,238	856,798	667,596
1965	969,066	824,662	671,448
1966	1,199,784	887,353	745,205

Source: Selected Manpower Statistics, Directorate for Statistical Services, Office of the Secretary of Defense, 15 April 1968, Table F11, p. 7.

draft-motivated enlistees. This last group consists of men who volunteered, but would not have in the absence of the draft, ceteris paribus. This mixed input system has a built-in diversity that is suggestive for future policy.

There is an age difference between the average draftee and enlistee. Existing Selective Service System policy (the "oldest first") gives the conscripts in our sample a mean age 1.8 years greater than their volunteer counterparts. The age difference could be meaningful in terms of maturity as well as in the employment experience that these men had prior to entry into the service. All these observable differences are supply side indicators and may be proxies for the alternatives available to the different groups - a set of implicit demand variables.

The component of entry affects the time in active service and therefore the array of occupations that are available. The draftee serves 24 months of active duty and then filters through the remaining four years of his obligation. The Army enlistee has a three year tour with an additional three years of obligation.[21]

The career path the soldier will follow depends on a number of factors not least of which is the number of months draft-motivated enlistees. This last group consists of men who volunteered, but would not have in the absence of the draft, ceteris paribus. This mixed input system has a built-in diversity that is suggestive for future policy.

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[21] The meaning and duration of the service is explained in Table III-2 below.

There is an age difference between the average draftee and enlistee. Existing Selective Service System policy (the "oldest first") gives the conscripts in our sample a mean age 1.8 years greater than their volunteer counterparts. The age difference could be meaningful in terms of maturity as well as in the employment experience that these men had prior to entry into the service. All these observable differences are supply side indicators and may be proxies for the alternatives available to the different groups - a set of implicit demand variables.

The component of entry affects the time in active service and therefore the array of occupations that are available. The draftee serves 24 months of active duty and then filters through the remaining four years of his obligation. The Army enlistee has a three year tour with an additional three years of obligation.[21]

The career path the soldier will follow depends on a number of factors not least of which is the number of months

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[21] The meaning and duration of the service is explained in Table III-2 below.

Table III-2 Alternative Enlisted Service Obligations

	Years
Army Draftees	
Active Duty	2
Active Reserve	2
Inactive Reserve	1
Standby Reserve	1
Total	6
Army Enlistees	
Active Duty	3
Inactive Reserve	2
Standby Reserve	1
Total	6
Navy Enlistees	
Active Duty*	4
Inactive (or Active) Reserve	1
Standby Reserve	1
Total	6

*A special program for Navy enlistees allows those who enlist **prior** to their eighteenth birthday to be released from active duty the day before their twenty-first birthday.

of obligated service remaining after completing his course work. While individual preference, aptitude and experience are involved in the allocations of recruits to military occupations, demand factors swing massive weight.[22] The training time is an investment with a dual cost dimension, and the longer its duration the lower is the rate of return for the service. This suggests that training time be low and training particularized. Each hour spent in training raises the cost of specific human capital within the military and reduces the period of productivity, both lowering the internal rate of return.

This fixed time constraint is applicable to a degree in all the services. Each service is aware that enlistees rarely reenlist. Both the Navy and Air Force, depending on enlistees, require a four year active hitch with two years of reserve obligation.[23] This added time in service permits training programs of a longer duration and of wider occupational scope.

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[22] An important factor in career assignment is the state of the manpower inventory at any moment in time. If there is a shortage in some occupation as expressed by empty billets in units, then the primary task of the assigning officer is to fill the billets even if economists become bakers. Improved planning has meant that fewer malassignments take place, i.e. physicists made cooks, and teachers made police -- followed shortly by police becoming teachers.

[23] These are the primary options. A wide variety of options exist legally and operationally, but these are the primary forms for enlisted men.

It would be improper to conclude that the inflexible time in service alone determines the occupational structure. Interacting are the choices of hardware, the occupational structure and the modes of recruitment. The longer regular service obligation in the Navy reflects the decisions made for both the occupational structure and the hardware that is used.

The Navy conceptualizes itself as a fighting force dealing with highly diverse technical and logistical environments. Men, even on their first tours, are trained as generalists and then in specific areas. This is a derivative of the rotation system used universally in the military which restricts the length of time on one job in any one place. The effect of rotation is more apparent in the Navy where sea duty differs from shore duty, yet no one is trained for one and not the other.

Reinforcing the need for generalization is that no two ships, even of the same class and type, are substantially the same. The Captain of the ship, the yard where built, as well as the yard conditions and mission of the ship at time of repair or overhaul, make it a unique workplace shortly after commissioning. The Navy's occupational structure, training program, and length of service commitment are based on this fundamental operational need for versatile manpower.

The Army, on the other hand, has adjusted the set of decisions to produce a narrowly trained cadre assured of a fairly homogeneous environment. Men are trained in a relatively short period to do specific jobs and operate within a set system. The organization is structured and hardware standardized, so as to preclude the necessity for broad training.

These two positions reflect poles of choice that serve as a continuous source of conflict in the defense establishment. In an attempt to make the services efficient there is continuous experimentation on how men are to be produced as well as how the missions are to be performed. A radioman in the Army is not the same as in the Navy. This is highly significant if one thinks of trying to influence occupational crossover.

As a rule, the Navy jobs are broader than those of the Army and therefore one expects that the Navy experience is more like civilian jobs and training. While this is known, ex ante, it suggested itself for testing ex post. In order to examine two extremes in training we questioned whether the Air Force and/or Navy should be included in the study for comparison.

Initial contacts suggested that cooperation with the Navy would be difficult. This proved correct, and we attempted to substitute the Air Force for the Navy. Like the Navy, the Air Force is all volunteer, but their hardware policy and training program are closer to those of the Army. The difference is in the missions and the high proportion of enlistees in support roles. Officers in the Air Force fight, while enlisted men are like squires. The hardware used to support the missions is highly complex, and repair and maintenance require specific skills. The Air Force has approached the complex problem of training by breaking down skills and trying to design some management flexibility.

Variance is manifested in a comparison of the occupational classification systems of the services. The Army MOS (Military Occupation Specialty) was a three digit system and now is five digits. The Navy uses a letter and number system in describing NEC's (Navy Enlisted Classifications) and Rates signifying career progress. The Air Force uses the AFSC (Air Force Specialty Code). This is a five digit code, but the Air Force was the first to develop the "shred out" system. A letter is suffixed to the AFSC signifying training on a specific piece of equipment. An example may be useful. If we were to consider the occupation of X-Ray technician we would find an MOS, NEC, and AFSC code for it, but in no way would the men given these occupational designations be good technical substitutes for one another. The Army and Air Force technicians would be trained on a specific piece of equipment with almost no general medical background, while the Navy man would first have been a medical generalist and then trained for a wide assortment of X-Ray equipment which he might find on various types of stations.

Thus, the Army and the Air Force are similar in limiting their training to specialization, while the Navy insists that general training precede specialization. For the purposes of the research it was preferable to represent both approaches. Conveniently, a reversal of attitudes rendered the Navy more amenable to the research, while the Air Force became more reluctant. For these reasons, then, the populations for the study were drawn from the Army and the Navy.

Occupations

"Although the main objective of education in the Armed Forces is to train troops for combat, at least 60 percent of what is taught is applicable to civilian occupations."[24]

"In 1960, about 85 percent of the 2,153,457 enlisted personnel in the Armed Forces, or approximately 1,830,000 servicemen and women had [civilian] occupational designations."[25]

The percentages used by Clark and Sloan were developed in a way that requires explanation if not apologies. As shown in Appendix A, each military occupation has a list of civilian counterpart occupations attached. The civilian occupations are designated according to both the Dictionary of Occupational Titles (DOT) and Civil Service Codes. The linkage is _ex ante_ and based upon the individual service's estimate of relatedness. The relation is considered dichotomous and the task of establishing specific tie-in has always been considered a low priority undertaking within the military. The result is that there are both Type I and Type II errors in their evaluation of convergence.

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[24] Harold F. Clark, and Harold S. Sloan, Classrooms in the Military. (Institute for Instructional Improvement, Inc., Teachers College, Columbia University: New York, 1964), p. 104.

[25] Ibid., p. 103.

The Air Force, for example, lists no civilian occupation related to a turret mechanic (AFSC 323X0). The thinking which led to this particular decision is indicative of the limitations of these _ex ante_ evaluations in general. The absence of turrets per se in the civilian sector meant that there is no transferable occupation. Air Force training of a turret mechanic, however, includes intensive classroom training, both theoretical and practical, in mechanics, electronics and hydraulics. The emphasis on hardware, that is, identical equipment, to the exclusion of relevant training or work, results in the misleading implication of non-transferability.

The linkages between military and civilian activity are not obvious. The police category is an interesting case in point for examining the real or imagined convergence in occupational structures.[26] The related DOT notations for the Military Police (MOS 951) are: 375.268, 376.868, and 372.868.

Standing against this are the following facts:

- In the District of Columbia no effort was made to recruit military policemen as part of the program for early military discharge. The District Police Force believes that military policemen are not really policemen, i.e. have no transferable skill. This decision was still operative after the Washington riots of April, 1968 when MP forces performed para-civilian police work.

- In New York City the Police Department gives no recognition beyond the veteran's five point bonus to any military policeman applying for membership on the force. The absence of any explicit or implicit rewards, coupled with the long wait between passing of the requirement test and actual employment suggests that there is no _de facto_ relation between military and civilian policemen.

For metropolitan areas it would appear safe to say that the military policemen are _ex post_ as related to civilian policemen as are cooks (MOS 941), Boatswain's mates (NEC 0100), and turret mechanics (AFSC 323X0). What is required to isolate convergence is some set of standards for establishing relatedness. This is part of the mission of this study and dictated that we choose a variety of occupations that would have some economic meaning as well as be significant in the training program of the services. This was difficult, however, due to the variance in the occupational structure among the services.

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[26] Albert D. Biderman and Laure M. Sharpe, "The Convergence of Military and Civilian Occupational Structures: Evidence from Studies of Military Retired Employment," _The American Journal of Sociology_. Vol. 73, No. 4, January 1968, and Albert D. Biderman, "What is Military?" _The Draft_. Sol Tax, Editor, (Chicago: University of Chicago Press, 1967), p. 122.

One criterion for selection was the criticality of the skill. Criticality has two dimensions depending on whether one looks at the problem from the civilian or the military side. While no explicit guides are readily available, police, health, and education are obvious areas. Other less obviously critical shortages surface through specific interest groups. The American Baking Institute has expressed as much concern over the production of bakers as the F.A.A. has over the output of flight mechanics. The occupational groups finally selected are listed in Appendix A.

The category of policemen was chosen because of the shortages in the civilian as well as the numbers produced in service. For the Air Force and the Army, police are a major group for training purposes. The military in 1959 trained over 26,000 policemen. In the Army, for example, these men are carefully screened and have a minimum general aptitude test score above the mean score of the Army as a whole. After eight weeks of basic training, they receive eight weeks of advanced individual training and then eight more weeks in basic unit training before being assigned to military police operating units to work with supervisors in a form of on-the-job training.

Having observed the training and duties of the police in the military and in the civilian sector, one must conclude that there is little wanting on the military side. In fact, except for some of the more sophisticated metropolitan police, or state police systems, the teaching, curriculum and experience in the Army cannot be duplicated in most local systems. In the two years which a draftee serves he gets an excellent background and experience. The question that we must ask is, what does he do with this experience after service?

The services differ in their police function. The Navy has no permanent police cadre. Rather, men from diverse assignments are allocated to shore patrol and police work for short service. In the Air Force there is a specific police group but the training is less thorough than that of the Army. It is unlikely that the potential enlistee knows any more about these service differences than prospective employers.

Two occupational groups suggested themselves out of both rumor and the expressed interest of the services; they are electronic data equipment skills (repair and operations) and Radio, Radar, TV and Auto repair. These activities involve considerable training which gives rise to the military's complaint that civilian industry is a substantial drain on the military manpower. This argument underlies the repeated requests of the Department of Defense for selective pay increases.[27]

Clearly there is a need on the civilian side for good auto mechanics and EDP operators. Both the similarity of civilian and military equipment and the apparent demand for military trained personnel by defense related industries augured well for high convergence *ex post* as well as *ex ante*.

The apparent identity of hardware, equipment and organization suggested trades in the telephone industry be likely ones for transferability. The Department of Defense indicated that their training and equipment were similar to those in the private sector. Hence, transfer should be high. Discussion with telephone company personnel officers indicated a marked absence of knowledge about the military's telephone activities and no way of recognizing experience in the military as a lineman, installer, central switchboard repairman or any of the many technical occupations.

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[27] Gorman C. Smith, *Occupational Pay Differentials for Military Technicians*. Unpublished Ph.D. dissertation, Columbia University, 1964.

While there was a strong dispositon on the part of telephone companies to hire and train veterans, the specific skill was not necessarily a factor.

An additional characteristic suggested that this group be used. It is classified as an imbalance skill. This implies that after training, military work in the trade could only be performed outside the continental United States. A number of these imbalanced skills exist ostensibly to stop the military from competing with civilian producers of the same service. Consequently, the work experience in a skill related to their training of this group on the average would be less than for the other groups, save "Operatives."

After making the choice we proceeded as usual to examine the training. Our investigation of cooperation between civilian and military uncovered one of the other "basic truths" of the study. The official information believed, dispensed and acted upon in Washington, or at CONARC (Continental Army Command Headquarters, Fort Monroe, Headquarters for Training Commands) does not reflect what actually happens. Contrary to our information from the Pentagon, the permanent staff at Signal School, where the telephone curriculum is prepared and where they instruct the soldiers, had never met with representatives of civilian telephone companies. Nor had they ever visited the civilian facilities or seen the civilian manuals, curriculum or anything else. Yet, they were quite willing to state that the Army's training was superior to the civilian.

Our investigation covered another area of imbalance skills --- Operatives. These are trades such as plumbers, carpenters, and the like used on the support side of the military's operations. While training courses for instant artisans are on the books, very rarely, outside of a major wartime buildup, are the courses activated. The normal practice is for the recruit to receive a "direct duty assignment." That is, after basic training a person is given the MOS on the basis of his prior occupational experience. When men come in with experience as union members, their assignment indicates knowledge of these occupations and its high relative civilian wage. This method of assignment meant that the military occupations are in line with the career choices of the recipients. We conjectured that if such recruits were to be exposed to new alternatives while in service, the military experience might alter the direction of the post-service occupational path.

Occupations with high civilian wage structure and heavy unionization, but without a history of exclusiveness, are those associated with the Teamsters Union. The operation of stores and warehouses along with the movement of material by truck is a major activity within the services and is a large and growing activity in the private sector. Those occupations were included as a balance against the activities suspected of being restrictive.

A late addition to the list of occupational groups is business and service activities. These auxiliary occupations loom large in training effort and importance in the services. These service occupations are becoming more important in the growth of civilian employment, the demand being high in both governmental and private service agencies. While not appearing as a technically complicated type of training, their importance is linked to the potentials of dealing with disadvantaged groups rather than salvaging a scarce resource produced in the military and needed by the civilian sectors.

Our concern over the validity of the military's *ex ante* techniques employed by Clark and Sloan led to Group 7, which for the lack of any better name was referred to as "esoteric skills." The military also judged these skills to be nonrelated. Despite ample formal technical training, the absence of an obvious related DOT or piece of hardware led to a denial of relatedness. Our hypothesis was that relatedness is a continuous variable depending on the perception of the trainee as well as the prospective employer. A bright veteran could pursue activities both in terms of primary employment and in moonlighting that would not appear likely to his less able colleague.

Our design, focusing on the differential impact of the military, required a control group. We had assumed that the process of going through the military may be an independent factor influencing men apart from any occupational impact. Owing to the selectivity of the services it is difficult to isolate a group that did not go through the service as a control. We opted out of the difficult control problem by focusing on occupational crossover. We sought a group that would be a proxy for the military, but _ex ante_ would have no civilian relationship. Two groups have been chosen to reflect this "pure" military effect. They are the light and heavy weapons Infantry for the Army (MOS 111 and 112) and the Boatswain's Mates (NEC 0100) for the Navy. A great proportion of men going through the service go into these activities. Generally these are the average soldiers and sailors.

The Army "Duty Soldier" (MOS 540) was included to permit a look into the lower ability population. After basic these men do menial tasks or perform undesirable services (grave-digging, etc.). While occasionally a genius shows up as a general duty soldier because they can't place him anywhere else, the average of these men is less than the Army _in toto_.

While groups other than these could be justified, our choice allows a test of the _ex ante_ model used by the military and adopted by others. It also focuses on characteristics in the civilian labor market which are suggestive of policy variation. The Army group, for example, gives narrow training in these occupations, with the exception of police, while the Navy suggests a wider degree of training but still supposedly less than full journeyman capability. Whether this level of skill affected transfer is an important factor yet to be tested.

The Groups

The period and form of military obligation is a choice partly open to the serviceman. Whether a man decides to enlist, reenlist, join the National Guard, or be in a ready reserve unit affects the extent of his training. It also may affect the transferability of his skills. Clearly, however, the choice of being in a reserve or Guard unit may be related to other characteristics which affect the utilization of military experience in civilian occupations. To avoid these complications we standardized the population by using a single service group, first-term enlisted men. While the cost of this is generality, other research strategies appeared more perilous.

Although possible groupings of the population were numerous, they were easily narrowed down. Enlisted men were preferred to officers to reduce the complications of the specific and general investment components of the prior education or post-service activity. While the findings are that pre-service activity is significant for the enlisted men, we believe that officers would have raised even more difficult problems.

We chose non-career personnel. The military includes those who reenlist after two to four years and, therefore, show a high likelihood of remaining twenty or more years in active service. The proportion of conscripts in this group is almost zero.

Having considered that the large throughput was worthy of study, we decided to include both draftees and all types of enlistees. Our interest was in developing a homogeneous sample with a considerable period of exposure in the civilian labor market, yet one which would be easy to identify, obtain data for, and locate for purposes of interviewing. The standby reserve for the Army and fleet reserve for the Navy satisfied these diverse requirements.

Our concern with the length of time out of active service was caused by the data obtained in the Thorndyke and Hagen studies.[28] They interviewed a group of Air Force veterans within a year of active service and found the group unsettled. We believe that for many men the military is a period that fractures the occupational pattern and that after service there will be a period of labor market instability. This can take the form of withdrawal from the labor force, unemployment, schooling, returning to an old job, or job-hopping. This phenomenon is independently worthy of study, and our design provides the information necessary to analyze it. Our primary purpose, however, was the long run adjustment after military experience as characterized by an indication of career commitment.

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[28] Robert Thorndyke and Elizabeth Hagen, An Exploratory Survey of Civilian Experience Related to Military Jobs. Air Training Command, Human Resources Research Center. Lackland AFB, Texas: June 1952.

The standby reserve is the last formal grouping into which a serviceman is placed prior to discharge from total obligation. Table III-2 shows typical service patterns for various groups.

Thus with approximately twelve months of their obligation remaining, the men become gains to the standby reserve. Their records are sent to a single records center and, until they are added to the loss file of the standby reserve, some of their record information is in machine usable form. The discharged group did not have this technical capability at the time the research was being planned.

An additional feature of this group is derived from the peculiarities of Selective Service System and reserve regulations. While a man is still in the reserves some attempt is made to maintain contact with him in order to have current information regarding location, occupation, and other factors which would affect his recallability. This is done by a periodic mail survey. As part of this and the regulation which states that all men must maintain contact with their local Selective Service Board,[29] the record enabled us to locate individuals.

Criticism can be made of our choice of the standby reserve compared to, for example, the active reserve. The latter, it has been suggested, would contain individuals interested in pursuing their military specialties; therefore would be more likely to pursue a related civilian occupation. While we believe that there are many reasons to stay active --- primarily social in rural areas and for retirement pay generally we remain skeptical about the difference in the degree of crossover between the groups. Plainly this is an empirical question which can only be clarified by appropriate research.

Summary

We have outlined our reasons for choosing the Army and Navy, the specific occupations, and specific manpower categories. They are arbitrary, but had analytical merit and were administratively easier to use.

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[29] This regulation is widely honored in the breech, but was still of value in carrying out this research. See Appendix C.

Chapter IV

THE MILITARY AS A SURROGATE FOR EDUCATION

Introduction

In the decade since economics reasserted its traditional interest in education under the rubric human capital, a number of interesting hypotheses have been raised and studies conducted concerning the economic value of education. Education's effect on income has received the bulk of research emphasis and notoriety for policy purposes.[30] The economist's marginal approach has framed the problems researched. The professional concern is with the effect of a marginal amount of education on altering the lifetime earnings (appropriately defined) of an individual and the effect that this may have on growth, income distribution and other aspects of economic performance.

It is doubtful that the payoff to human capital is linear and uncomplicated. Kinks, steps, breaks, and no less, undulations, are still a bugbear to a calculus oriented group. Economists perceive education as a continuing experience with the learning smooth and possibly linear. While learning and the educational process may approximate this, the economic value of learning in tangible terms appears to be discontinuous.

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[30] Gary S. Becker, Human Capital. (New York, National Bureau of Economic Research, 1964); Edward Denison, The Sources of Economic Growth in the United States and the Alternatives Before Us. Supplementary Paper no. 13, (Committee for Economic Development, New York, 1962); William G. Bowen, Economic Aspects of Education. (Industrial Relations Section, Princeton University, 1964); Theodore W. Schultz, The Economic Value of Education. (Columbia University Press, 1963).

Significant instances of such discontinuities emerge in a comparison of men who have completed twelve years of schooling, called graduates, and those who have terminated their education before that point, called dropouts. The act of dropping out causes, or catalyzes, a flood of grievous consequences, and we become acclimatized to think of dropouts as a significant category both conceptually and empirically.

Differences appear in records of unemployment, crime, and health. In Table IV-1 we see that the rate of unemployment is more than 60 percent higher for dropouts compared to graduates, controlling for variables of race, sex, color, and age. The unemployment problem is aggravated in the younger group, and this is deceptively understated through our failure to consider under-employment.

Other deficiencies from not completing high school show up when we examine the population of offenders. While dropouts make up less than 25 percent of the relevant age group, 18-24, for 1967, they were 75.3 percent of all those who were committed to Federal penal institutions.

A markedly different set of rewards is available to the high school graduate compared to the dropout. The

Table IV-1 Unemployment Rates by Age, Color, and Education

Group	White				Non-white			
	18-24	Ratio*	25-34	Ratio*	18-24	Ratio*	25-34	Ratio*
All less than high school	9.6	(1.9)	4.6	(1.8)	22.2	(1.8)	9.1	(1.8)
High school graduates	5.0	(1.0)	2.5	(1.0)	12.2	(1.0)	5.5	(1.0)
All greater than high school	3.5	(0.7)	1.3	(0.5)	6.7	(0.5)	4.3	(0.8)

Unemployment Rates by Color, Sex, and Education

Group	White				Non-white			
	Male	Ratio*	Female	Ratio*	Male	Ratio*	Female	Ratio*
All less than high school	4.0	(1.7)	5.8	(1.6)	8.7	(1.6)	13.0	(1.7)
High school graduates	2.3	(1.0)	3.7	(1.0)	5.4	(1.0)	7.7	(1.0)
All greater than high school	1.3	(0.6)	2.4	(0.6)	3.2	(0.6)	5.0	(0.6)

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*The ratio refers to four year high school completers as the base group for all comparisons.

Source: Compiled from tables in Special Labor Force Report No. 92, Educational Attainment of Workers, March, 1967, U. S. Department of Labor, Bureau of Labor Statistics.

explanation for the market treatment suggests three effects on education: a certification effect, an option effect of education, and a "thems what has gets" effect. We shall examine whether military experience is an adequate substitute for education with regard to the benefits of these effects.

The Educational System in the Military

Our research has been primarily concerned with the impact of the technical and vocational experience on servicemen after discharge. The problem of defining an appropriate base group and the pure effect of the military on the individuals is a source of considerable concern in measuring the occupational consequences of military service. For example, at an early stage in our research we examined the effect on income of training and service in different occupational skill categories.[31] It was assumed that the benefits of the military *per se* are equal for all veterans. That was a naive hypothesis. Here, as we examine the "total" effect we observe how characteristics of the input force affect the potential payoff to the veterans. Our primary education hypothesis is that the military serves as a recognized equivalent for educational achievement and therefore has the effect of being more valuable for lower educated than higher educated people and may have a negative value after some education level.

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[31] Eugene Jurkowitz, "An Estimation of the Military Contribution to Human Capital," unpublished Doctoral Dissertation, Columbia University (Appendix E); and Paul A. Weinstein and Eugene Jurkowitz, "The Military as a Trainer: A Study of Problems in Measuring Crossover," *Proceedings of the Social Statistics Section, American Statistical Association 1967*, (Appendix F).

The reasoning behind this empirical hypothesis can be categorized in three types of effects explaining the functioning of the payoff from education. First is the certification or diploma effect. This focuses on minimizing the employer's costs in adding to and maintaining a work force. Underlying the employer's problem is the necessity to identify worker attributes to warrant the expense of recruitment, training, etc., plus a reasonable chance that the worker's productivity will not meet the going wage and a capital return.[32] Personnel officers invariably reward high school graduates and as a counterforce punish the school dropout. In the short run, the diploma is evidence of adaptability, serves as a minimal guarantee of future performance, and minimizes the firm's cost of selection.

The failure to complete high school is also associated with a tendency toward underachievement throughout the schooling career and may be a manifestation of something more fundamental. Frequently the simple act of noncompletion is really an indicator that the problems are deeper and may have potentially adverse consequences if brought into the firm.

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[32] Walter Oi, "Labor as a Quasi-fixed Factor," Journal of Political Economy. Vol. LXX, No. 6 (December 1962); and Jacob Mincer, "On-the-Job Training: Costs, Returns, and Implications," Journal of Political Economy. Vol. LXX, No. 5, Part 2 (Supplement: October 1962).

Professor Burton Weisbrod refers to a second major effect associated with high school completion.[33] The educational structure and the world of future jobs and income opportunities can be viewed as an inverted pyramid or cone. By attaining an additional level of education one has the advantage of an immediate set of jobs plus the option to secure more education. This, in turn, is associated with the likelihood of more jobs and additional options. High school completion can be viewed as an option threshold and may be of high import. This suggests that the person who cuts off his education below the threshold faces a reduced range of alternatives. He is subjected to a potentially wider fluctuation in income and employment than a person holding options on a hedging group of occupations and educational activities.

We tested the hypothesis that a period of adequate service in the military, i.e. with a normal discharge, serves as a surrogate for the effects of completing high school. No matter what the length of tour --- six months, two years, etc. --- the argument suggests that going through the military reduces the negative effect of dropping out of school. The test would be whether school dropouts after completion of the military service have experiences in unemployment, education demand, or career planning more like those of the dropouts or the non-dropouts without military service. If more like the latter, then we would conclude that service experience has an effect not unlike high school certification.

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[33] Burton A. Weisbrod, External Benefits of Public Education. (Industrial Relations Section, Princeton University, 1964), p. 15-39.

Underlying this judgment is the proposition that for some people the military may be a more appropriate environment for learning than the normal secondary school.[34] Options previously closed as a result of the failure to complete secondary school might now be opened. The implication would be that military service gives more advantage to the school dropout than to others in society, i.e. it eradicates prior educational sins.

A third positive effect of the military in reducing the dropout stigma is accomplished through its greater investment in human capital compared to the civilian sector.

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[34] A fundamental problem is in differentiating between the person of ability, but in an adverse environment, with the person of low potential. We shall identify these groups by performance on the Army GT test and the Navy GCT test, an overall ability indicator. While imperfect and correlated to education ($r^2 = .327$), it is useful and better than ignoring the problem of multi-colinearity completely.

Some suggest that high aptitude and high education people receive increasing amounts of general education. Partly this is a rent for their abilities and becomes capitalized in their future income streams. This raises their lifetime earnings. The school dropout would ordinarily receive little human capital. These private decisions would widen the differences between the school dropout and the school completer in the long run.

The military is usually unwilling to give special treatment to either the high education or the low achiever group.[35] Consequently a high aptitude person would receive less investment in general capital than he would receive as a civilian, thus lowering his income stream. On the other hand, the school dropout receives more and a different type of capital than usually distributed by the civilian sector. This democratizing or leveling activity of the military should result in a narrowing of the economic performance indicators between the two groups.

Dropouts and Non-Dropouts at Entry

As expected there are significant differences among the military entrants when categorized by education. While

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[35] Paul A. Weinstein and William B. Clatanoff, Jr., "The Economics of Alternative Uniform Military Procurement Policies," Forensic Quarterly; and S.H. Altman and A.E. Fechter, "The Supply of Military Personnel in the Absence of a Draft," American Economic Review. May, 1967.

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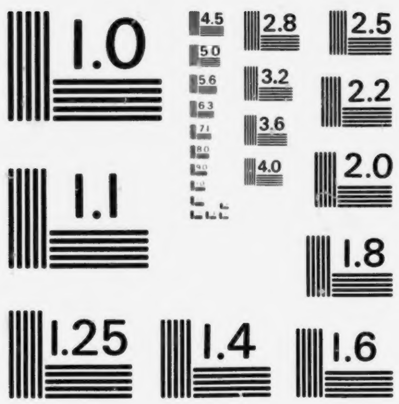
1.0
4.5
5.0
5.6
6.3
7.1
8.0
9.0
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.1
1.8
1.25
1.4
1.6

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

the data was analyzed in a number of ways, including aptitude, it was most useful to categorize the group by "some, but not high school completion," "high school graduates with no further education," and last, "greater than high school but no degree completion." In doing so we eliminated the extremes of education from the Army sample; 207 had less than high school, 1164 had exactly high school, and 319 were beyond high school bud did not complete college.[36] The compression of the educational categories reduced some of the variance in the population. Our interest was in the large number of dropouts, not the deviant, both genius and dullard.

The GT test in the Army and the GCT test in the Navy are general measures of ability, based on mathematical and verbal skills. They are more related to the notion of general problem solving ability, IQ, than the Armed Forces Qualifying Test (AFQT). The mean for the Army is 100, with a standard deviation of 12 (60 percent of the recruits fall between 88 and 112), and for the Navy the mean is 50. An examination of the sample reveals (See Table IV-2) that the high school dropouts are generally of lower ability but that overlap exists. Some of the observed relations may be a

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[36] We keep the larger categories to suggest the impact of the extremes. Examined are combined high school and grammar school dropouts, graduates, and non-college completers.

Table IV-2 Aptitude Characteristics of Sample Population by Education

	ARMY			NAVY		
Group	Mean GT Score	Standard Deviation	Number in Group	Mean GCT Score	Standard Deviation	Number in Group
1. All dropouts	90.5	17.3	274	52.81	7.56	257
2. High school dropouts	93.2	16.4^{b}	207	53.06	7.44	248
3. High school graduates	108.7	14.5^{bcd}	1164	58.12	7.00	551
4. Some college	122.2	14.6^{c}	319	64.12	6.74	82
5. All greater than high school	124.4	14.5^{d}	469	64.64	6.50	109
Matched Groups by Aptitude*						
6. Low Aptitude Less than high school	91.9	4.1^{e}	94	45.94^{e}	2.80	71
7. Low Aptitude High school graduates	93.8	4.0^{e}	224	45.80^{e}	2.65	63
8. High Aptitude Less than high school	105.8	4.1^{f}	65	54.60^{f}	2.74	128
9. High Aptitude High school graduates	107.5	4.6^{f}	486	55.18^{f}	2.78	240

SOURCE: Coded from Army Form DA-20 and NAVPERS Form 601-3.

Key: Matched letters indicate that the two groups are rejected as coming from different populations, using the "F" test on standard deviations and the "t" test for the difference of means, both at the .95 level.

*Army: Low Aptitude = GT 85-99; High Aptitude = GT 100-115. Navy: Low Aptitude = GCT 42-50; High Aptitude = GCT 51-59.

result of measured ability rather than schooling. We examined high school graduates and high school dropouts normalized for aptitude.[37] The objective was to focus more sharply on the high school dropout problem.[38]

In addition to these objective differences in aptitude and education the attitudinal variations between the dropouts and non-dropouts were examined. Their views of the military, which marginally reflect the relative economic advantage of service, are shown in at least two dimensions. (See Table IV-3).

No significant differences are observed for the Army when our limited group of dropouts (2) and all dropouts (1) are compared with graduates (3). This relation is maintained for the Army and appears for the Navy when we hold the GT levels constant. However, the notion of similarity is rejected when graduates are compared to the high education groups. These latter groups show significantly less interest in enlisting and this disposition is more pronounced as the level of education is increased. Strong interservice differences appear, with the Navy showing more affirmative

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[37] Note that the proportion of the Navy in the lowest group is less than in the Army.

[38] What is said refers not only to the educational level but to the performance level on tests. The military may raise ability as measured by tests as well as the educational level of the lower end of the distribution going through it.

Table IV-3A Voluntarism and Preference for Job at Time of Entry into Service

ARMY

	Group	Volunteer	Non-Volunteer	Occupational Preference	None
1.	All dropouts	74^{a}	200	116^{a}	158
2.	High school dropouts	61^{ab}	146	94^{ab}	113
3.	High school graduates	344^{ab}	820	525^{abcd}	638
4.	Some college	54	265	150^{c}	169
5.	All greater than high school	63	406	230^{d}	239
	Matched Groups by Aptitude*				
6.	Low Aptitude Less than high school	26^{e}	68	39^{e}	55
7.	Low Aptitude High school graduates	73^{e}	151	110^{e}	114
8.	High Aptitude Less than high school	15^{f}	50	27	38
9.	High Aptitude High school graduates	155^{f}	331	272	214

SOURCE: Card #1, Columns 26,27, Questions 8,9.
Column 28, Question 10.

Note: Non-volunteers includes draftees and enlistees who would not have entered service in the absence of a military **draft.**

Matched letters indicate that the two groups are rejected as coming from different populations by Chi square at the .95 level. It is used throughout.

*Low Aptitude is GT 85-99; High Aptitude is GT 100-115.

Table IV-3B Voluntarism and Preference for Job at Time of Entry into Service

NAVY

Group	Volunteer	Non-Volunteer	Occupational Preference	None
1. All dropouts	226	31	159	98
2. High school dropouts	218	30	153	95
3. High school graduates	452	99	381[cd]	170
4. Some college	43	39	50[c]	32
5. All greater than high school	50	59	65[d]	44
Matched Groups by Aptitude*				
6. Low Aptitude Less than high school	67[e]	4	42[e]	29
7. Low Aptitude High school graduates	54[e]	9	36[e]	27
8. High Aptitude Less than high school	112[f]	16	82[f]	46
9. High Aptitude High school graduates	197[f]	43	166[f]	74

For Source and Notes see Table IV-3A.

*Low Aptitude is GCT 42-50; High Aptitude is GCT 51-59.

views toward service but, as with the Army, these are inverse to the levels of education.

The attitude toward the military can also be gleaned from the responses to interest in a particular job or training program in the military. The concern here is whether dropouts, graduates, and higher educated are alike or dissimilar in their view of the military. Strong similarities are seen in Table IV-3 in comparing dropouts to high school graduates (1 and 2 to 3) and those in the lower GT category (6 and 7). However, the hypothesis of similarity is rejected for the higher aptitude groups of the Army but not the Navy (8 and 9). The lowest education group (all dropouts, including the grammar school incompletes) has a 42 percent rate of interest while the high school dropouts had a 54 percent rate of preference. This suggests that the lowest Army group has a very low interest in the Army.[39] On the other hand, there appears a high interest in the Navy that varies with education, but that is everywhere higher than for the Army.

The expressed interest in the military as a viable economic alternative by these groups is in keeping with the notion of the relative payoff to education and training in the civilian compared to the military sector. These expressions may reflect a reasonable appraisal of their prospects.[40] The preference for occupation clearly cuts across the educational lines. For the Navy group interest is more closely associated with measured ability than with education, and the relation of aptitude to interest is clearly positive. The incidence of pre-service employment in our sample was high for all the respondents, regardless of education, (82 percent of the Army group had jobs prior to service). We know that unemployment has run consistently and dramatically higher for dropouts (see Table IV-1). Thus, the likelihood is that while there is evidence of employment, the overriding force of general data is that employment is unstable for the young, and particularly so for the high school dropout. There is no indication at this time of either the quality of the pre-service employment, say, as judged by wage rates, or of its stability or duration. With general population data indicating differences between dropouts and non-dropouts, and our own survey data supporting that material, it is possible to see if the education categories become alike after service.

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[39] This group is a small part of the military and may be the most difficult of all the groups to affect for economic purposes. Plainly theirs is a different group than the high school dropouts, and human resource work must make a careful distinction between them. Other characteristics of this lowest group will be presented in later work.

Immediate Post-Service Experience and Planning

The period covered by our interviews was three to five years after active duty and was long enough to detect patterns of time usage.[41] Our concern was with the nexus of military and civilian life as well as the long term adjustment. Immediately after separation a hiatus may occur when the veteran may withdraw from the labor force; or he can pursue any of the varied activities that could be available. The military may affect the labor force participation rate, career pursuit, and educational planning activity. The question was whether dropouts behave differently from graduates in these activities. Our hypothesis was that they are alike, but that as a group they show differences when compared to their better and inferior achievers.

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[40] Melvin Reder, "Review Article of Gary Becker's Human Capital," Journal of Human Resources, Vol. II, No. 1, Winter 1967.

The material to test this hypothesis is presented in Tables IV-4 and IV-5.

The similarity of behavior on the part of the high school dropouts and non-dropouts across services is sharply visible in Table IV-4: with high confidence ($p = .95$) it can be said that there is no difference between graduates and high school dropouts in activity choice, the choice composed of job seeking, continued education, or returning to prior employment. The pursuit of education either completely or jointly with employment does not differ significantly between dropouts and non-dropouts (2 and 3). The proportion, however,

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[41] The procedure for handling the variance in time is discussed in Weinstein and Jurkowitz, op. cit. (Appendix F).

Table IV-4a **First Post-Service Activity and Incidence of Returning to Jobs in First Employment***

Group	Job	School/Both	Veteran returned to former job	Other
1. All dropouts	263	11	134[a]	140
2. High school dropouts	196[b]	11	93[b]	114
3. High school graduates	1068[b]	86	583[abcd]	581
4. Some college	248	80	159[c]	160
5. All greater than high school	374	94	228[d]	241
Matched Groups by Aptitude				
6. GT 85-99 All less than high school	91[e]	3	46[e]	48
7. GT 85-99 High school graduates	210[e]	14	108[e]	116
8. GT 100-115 All less than high school	62[f]	3	33[f]	32
9. GT 100-115 High school graduates	455[f]	31	239[f]	247

Source: Card #1, Column 34, Question 14

Source: Card #1, Column 65-66, Question 21

*Army sub-set

Table IV-4b First Post-Service Activity and Incidence of Returning to Jobs in First Employment*

Group	Job	School/Both	Veteran returned to former job	Other
1. All dropouts	222[a]	35	27[a]	230
2. High school dropouts	214[b]	34	27[b]	221
3. High school graduates	455[ab]	95	67[ab]	485
4. Some college	52	30	28	54
5. All greater than high school	76	33	36	73
Matched Groups by Aptitude				
6. GCT 42-50 All less than high school	64[e]	7	5	66
7. GCT 42-50 High school graduates	57[e]	6	8	55
8. GCT 51-59 All less than high school	112[f]	16	17	111
9. GCT 51-59 High school graduates	304[f]	35	36	215

SOURCE: Same as Table IV-4a

*Navy sub-set

of postgraduates seeking the added training is significantly higher as is the Navy's experience compared to the Army's. There is a clear distinction between these post-graduates and high school graduates. The high education group goes on to even greater levels of accomplishment. The two higher groups, without regard to service, consume education at an appreciably higher rate than high school graduates.

We are unable to say anything more substantive about the motivation for the high education groups. They may come out of the military with a bottled up momentary education demand. They may be attempting to recover the time and human capital lost while in the service because of the military's equalizing investment policy.[42] The lower group continued to be unreceptive to education, though there was more education being sought by dropouts in the Navy than the comparable Army group.

Our primary conclusion about the absence of difference between dropouts and completers holds when the education levels are compared but aptitude held constant. While there is homogeneity in each aptitude group, a tendency to differ exists within the higher aptitude levels. There are probably many reasons for this variance, and it is unlikely that our data, or the field of economics, is likely to be helpful in specifying them.

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[42] See Appendix H, Regional Implications of the Post-Military Activities of Veterans.

Another area to test differences is in career planning (Table IV-5). Career planning after service has two dimensions: the object of choice, as well as timing of plans. While conceptually these may be separated, the survey evidence showed a clear dependence of the timing on the specific choice. Most Army veterans' post-service jobs are fixed prior to entry, while the reverse holds for the Navy cohort. The indicators are (Table IV-5) that there is no significant difference between dropouts and graduates, or for that matter between other groups.

In Table IV-4 the question whether a veteran returned to a job or did something else refers to his first post-service job experience. He might have gone to school, then looked for a job, and finally returned to his former job. The number who fell into this category was insignificant for all practical purposes.

Neither in where they went, when they planned, nor in their waiting to seek jobs were there any differences. The sole exception to this applied to Army high aptitude graduates who delayed employment after departure from the service. This is compared to the very quick readjustment of high aptitude dropouts. This again suggests that aptitude may be more important than education. These conclusions hold for both services with the variance stemming from the faster response of Navy veterans and the lower proportion returning to jobs.

Table IV-5a **Job Searching for Veterans Who Did Not Immediately Go to School***

Group	Returned to former job	Looked in service	Looked after service	Number of weeks before search for a job was begun[1]
1. All dropouts	131[a]	4	128	4.070[a] 6.131[a]
2. High school dropouts	91[b]	3	102	3.853[b] 5.447[b]
3. High school graduates	557[a b]	29	558	3.950[abcd] 5.295[abcd]
4. Some college	137	19	95	3.105[c] 4.145[c]
5. All greater than high school	200	36	141	3.141[d] 3.999[d]
Matched Groups by Aptitude				
6. GT 85-99 All less than high school	45[e]	2	44	3.909[e] 6.349[e]
7. GT 85-99 High school graduates	100[e]	4	104	3.990[e] 5.231[e]
8. GT 100-115 All less than high school	32[f]	0	30	3.133 2.542
9. GT 100-115 High school graduates	231[f]	12	224	4.070 5.542

Source: Card #1, Columns 37-38, Question 16.

*Army sub-subset

[1] Mean on top; Standard deviation on bottom.

Table IV-5b Job Searching for Veterans Who Did Not Immediately Go To School*

Group	Returned to former job	Looked in service	Looked after service	Number of weeks before search for a job was begun[1]
1. All dropouts	27^{a}	10	220	3.05^{a} 4.58^{a}
2. High school dropouts	27^{b}	10	211	2.99 4.56^{b}
3. High school graduates	62^{ab}	24	465	3.73^{ad} 5.08^{ab}
4. Some college	20	3	59	2.77 3.11
5. All greater than high school	27	6	76	3.20^{d} 3.48
Matched Groups by Aptitude				
6. GCT 42-50 All less than high school	5^{e}	3	63	3.41^{e} 5.85^{e}
7. GCT 42-50 High school graduates	8^{e}	5	50	3.36^{e} 4.59^{e}
8. GCT 51-59 All less than high school	16^{f}	3	109	3.21^{f} 4.40^{f}
9. GCT 51-59 High school graduates	22^{f}	8	210	3.81^{f} 5.51^{f}

*Navy sub-set

[1] Mean on top; Standard deviation on bottom.

This is related to the lower age at entry into the service, ergo, lower job or occupational attachment.

Education

Education and income serve as marks of distinction as well as indications of performance. Our survey affords two ways of viewing education for veterans with different education levels. The first is their own performance, through enrollment in educational programs. The second is the extent to which employers will invest in workers with different educational levels.

The first view of educational demand is seen through the activity chosen at the time of leaving the service (See Table IV-4). There was no difference between the below high school and the high school groups in this first choice. Only eight percent of the Army veterans were disposed to go to school, with a significantly higher demand from the Navy group (18 percent), but still a relatively small proportion. This similarity is observed when we consider all those with less than high school, as well as in the group normalized for aptitude. In the Army, only the higher education group (5) was a significantly higher demander of education than the other groups. Even they expressed limited demand, with but 20 percent going to school. In the Navy, the group with some college demonstrated the highest demand for education, with group (5) next, but both were higher than their Army counterparts.

There is considerable variance in the demand for education in post-service life of veterans, depending upon their prior education and service. We see in Table IV-6 that approximately 30 percent of all dropouts, in the Army group, either the limited or larger set, had some exposure to post-service education, while some 42 percent of high school graduates were enrolled in school. The comparable Navy groups indicate 59 percent continue their education. When we observe the proportion who had more than high school education upon entering the service we see that they are considerably larger demanders of education after military life. Thus, for those who have some college, or the group that had more than high school, approximately 60 percent had some educational activity upon leaving the Army, while the percentage for Navy veterans was closer to 80.

When we observe the effect of aptitude, we see in the Army that there are very substantial differences in the populations. While there is little difference among the high aptitude high school graduates and dropouts, there is a very considerable difference in education demand at the lower levels. Approximately 33 percent of all the higher aptitude individuals partake in some education while for the lower aptitudes we see that some 20 percent of the lower aptitude school dropouts are so engaged. However, only 9 percent of the high school graduates in the lower aptitude

Table IV-6a **Post-Service Educational Experience - Full-time, Part-time, and Correspondence***

Group	Number Enrollment of Any Type Post-Service Schooling	 No Post-Service Schooling	Percentage of veterans with post-service schooling
1. All dropouts	78	186	31.7
2. High school dropouts	65	142	31.4
3. High school graduates	492	665	42.5
4. Some college	316	210	60.1
5. All greater than high school	399	269	58.0
Matched Groups by Aptitude			
6. GT 85-99 All less than high school	19	75	20.2
7. GT 85-99 High school graduates	17	154	9.9
8. GT 100-115 All less than high school	22 f	43	33.8
9. GT 100-115 High school graduates	193 f	293	39.7

Source: Card #1, Columns 42, 51, 60, Question 19a.

*Army sub-set

Table IV-6b Post-Service Educational Experience - Full-time, Part-time, and Correspondence*

Group	Post-Service Schooling	No Post-Service Schooling	Percentage of veterans with post-service schooling
	Number Enrollment of Any Type		
1. All dropouts	152	105	59.1
2. High school dropouts	148	100	59.6
3. High school graduates	379	172	68.8
4. Some college	69	13	84.1
5. All greater than high school	88	21	80.7
Matched Groups by Aptitude			
6. GCT 42-50 All less than high school	38[e]	33	55.5
7. GCT 42-50 High school graduates	36[e]	27	57.1
8. GCT 51-59 All less than high school	77[f]	51	60.2
9. GCT 51-59 High school graduates	152[f]	88	63.3

Source: Same as Table IV-6a.

*Navy Sub-set

set were enrolled. Once again, this suggests that aptitude had very strong bearing. This is further borne out for the Navy. The aptitude groups are relatively close together and reinforce the significance of aptitude vis-a-vis education. It is also shown that Navy veterans are higher education seekers than the Army veterans.

When all veterans who had had some post-service schooling were asked whether they were still attending school at the time of the interview, the incidence was low for all groups except for the higher education Navy groups (Table IV-7). Neither the prior level of education nor the aptitude of the groups had any bearing on whether they were enrolled. We inquired in greater detail about the length of time that they had been engaged in either full-time, part-time, or correspondence courses. An examination of Table IV-8 shows no differences for the Army between the hgih school dropouts and the high school graduates in any of the three types of educational activity with respect to the average number of months. Once again, we observe that where consistency is noted between dropouts and graduates, this consistency is amplified when we examine these groups controlled for aptitude. Here we see that not only are the differences minimal in the means, but even in the standard deviation estimates.

The Navy experience is markedly different. The dropouts show a slightly higher demand for full-time schooling than

Table IV-7a **Attendance in School at Time of Interviewing of Veterans***

Group	currently attending	not currently attending
1. All dropouts	29 [a]	49
2. High school dropouts	23 [b]	42
3. High school graduates	158 [abcd]	334
4. Some college	102 [c]	214
5. All greater than high school	142 [d]	257
Matched Groups by Aptitude		
6. GT 85-99 All less than high school	6 [e]	13
7. GT 85-99 High school graduates	24 [e]	46
8. GT 100-115 All less than high school	10 [f]	12
9. GT 100-115 High school graduates	47 [f]	146

Source: Card #1, Columns 46, 55, 64, Question 19d

*Army sub-set

Table IV-7b Attendance in School at Time of Interviewing of Veterans*

Group	Currently attending	Not currently attending
1. All dropouts	73[a]	184
2. High school dropouts	72[b]	176
3. High school graduates	166[ab]	385
4. Some college	37	45
5. All greater than high school	44	65
Matched Groups by Aptitude		
6. GCT 42-50 All less than high school	13[e]	58
7. GCT 42-50 High school graduates	11[e]	52
8. GCT 51-59 All less than high school	38[f]	90
9. GCT 51-59 High school graduates	60[f]	180

Source: Same as Table IV-7a

*Navy sub-set

the high school graduates. Each of the groups shows a larger education demand than comparable Army groups. Another indication of the influence of aptitude over education is seen in the comparison of groups 6 through 9. The high aptitude dropouts demand more education than the lower aptitude dropouts or the equivalent aptitude high school graduates.

Intra-service patterns are substantially reduced when part-time education is considered, and the pattern is reversed in the area of correspondence schooling. In that latter category, the lower educational group of the Navy is below the Army, but this is reversed for high school graduates.

In both exposure and intensity of post-service education the Navy more positively affects its dropouts than the Army. Whether this is due to the service, natural selection, or the Navy's selection we cannot say. However, there is a positive effect on dropouts from the service and this is substantially greater from the Navy experience.

On the basis of the evidence that we have, one cannot discern any substantial differences in demand for education between high school dropouts and graduates, particularly when aptitude is taken into account. Certainly this demand is related to the former level of education of the veterans. While education is not widely demanded at the lower levels, it is possible for the veterans to pursue additional education, although plainly there is no great demand for this activity.

Table IV-8a **Length of Study in Months by Type of Education**[**]**

Group	Full-time[*]	Part-time[*]	Correspondence[*]
1. All dropouts	11.06 10.68	13.38 12.27	11.59 12.28
2. High school dropouts	12.13^{b} 10.94^{b}	13.49^{b} 12.36^{b}	10.15^{b} 8.62^{b}
3. High school graduates	13.35^{b} 12.54^{bcd}	12.51^{b} 12.05^{bcd}	11.96^{bcd} 11.81^{bcd}
4. Some college	19.16^{c} 13.08	15.70^{c} 13.02	14.20^{c} 12.69^{c}
5. All greater than high school	17.84^{d} 13.05	15.57^{d} 13.17	13.35^{d} 11.89^{d}
Matched Groups by Aptitude			
6. GT 85-99 All less than high school	11.00^{e} 1.73	11.73^{e} 10.50^{e}	9.20^{e} 8.56^{e}
7. GT 85-99 High school graduates	7.35^{e} 11.74	13.05^{e} 11.30^{e}	13.69^{e} 14.60^{e}
8. GT 100-115 All less than high school	3.00^{f} 2.00	11.77^{f} 14.39^{f}	7.75^{f} 5.38^{f}
9. GT 100-115 High school graduates	13.78^{f} 12.05	10.39^{f} 10.74^{f}	8.10^{f} 6.87^{f}

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[*] Mean on top
Standard deviation on bottom

Source: Card #1, Columns 44-45, 53-54,62,63, Question 19c

[**] Army sub-set

Table IV-8b Length of Study in Months by Type of Education**

Group	Full-time*	Part-time*	Correspondence*
1. All dropouts	18.05^{a} 14.31^{a}	12.14^{a} 13.17^{a}	8.62 5.89^{a}
2. High school dropouts	18.05^{b} 14.31^{b}	12.21 13.40^{b}	8.15 5.63^{b}
3. High school graduates	17.43^{ab} 13.51^{abcd}	14.20^{acd} 12.00^{abcd}	15.25^{c} 11.41^{abcd}
4. Some college	21.07 13.31^{c}	16.05^{c} 12.76^{c}	12.83^{c} 12.94^{c}
5. All greater than high school	19.69 13.06^{d}	14.76^{d} 12.88^{d}	10.63 11.72^{d}
Matched Groups by Aptitude			
6. GCT 42-50 All less than high school	10.10 9.47^{e}	11.89^{e} 10.71^{e}	6.80 6.38^{e}
7. GCT 42-50 High school graduates	12.18 10.10^{e}	13.38^{e} 13.51^{e}	12.60 8.59^{e}
8. GCT 51-69 All less than high school	21.15 15.52^{f}	10.86^{f} 13.56^{f}	8.55 6.23^{f}
9. GCT 51-69 High school graduates	17.58 14.49^{f}	12.71^{f} 10.28^{f}	17.40 13.86^{f}

*Mean on top
Standard deviation on bottom.

Source: Same as Table IV-8a

**Navy subset

The analysis has centered on the veteran's plans and preference about education and employment. Indications are that most Army veterans return to former jobs, while a small proportion of the Navy people follow this pattern. An added dimension of the effect of the service experience can be determined from the employer treatment of this group through examination of civilian job training in the post-service years and its relation to educational status.

The employment exposure prior to service for the Army veteran was high, with 82 percent employed extensively enough for purposes of military records. Table IV-4 indicates that there was no difference among the education levels in their return to employers. The young age of the group suggested that this employment was trivial as well as casual labor. The high rate of job return, however, points to the jobs being worthwhile in planning or as a toehold for this young but aging group. The lower rate for the Navy suggests the strong and direct relation of age and occupational attachment.

Job training has two aspects which help clarify the treatment of dropouts and other groups. The veterans were questioned about formal and informal training given them by their employers both before and after the service (Table IV- 9). With almost no difference among the groups for the Army, 85 percent had received some form of training. The

Navy veterans show a higher training rate, approximately 90 percent, with the lower education group receiving marginally more OJT. From both services there is evidence that employers will invest in the high risk group after the service.

Our _a priori_ notion of the employers' treatment of dropouts suggested that the market would time the investment in specific training differently. Specifically: the high school graduates would be recipients of job training prior to entry into the service, while the training of dropouts would be postponed until after release from the military, i.e. until they were certified. This hypothesis was not supported by the survey (Table IV-9).

The vast majority of veterans from both services received training subsequent to leaving the military. We classified all veterans into two groups. The first received training before entering the service or had training that spanned their period of active duty. The remainder, two-thirds of the group, received no training or received it only after the service. For example, less than 10 percent of the Navy veterans had any pre-service training. This apparent contradiction to the hypothesis may be explainable within the confines of our assumption.

The pre-service investment for both the dropouts and graduates is likely to be distorted by the probability of military service. That is, we are witnessing a strong "draft" effect. The draft should reduce an employer's incentive to

Table IV-9a **Veterans Who Received Job Training and Timing of Job Training***

Group	Training	No Training	Training Before or Both	None Before
1. All dropouts	230[a]	44	99[a]	175
2. High school dropouts	174[b]	33	70[b]	137
3. High school graduates	978[abcd]	179	417[abcd]	740
4. Some college	447[c]	79	180[c]	346
5. All greater than high school	563[d]	105	220[d]	448
Matched Groups by Aptitude				
6. GT 85-99 All less than high school	72[e]	22	33[e]	61
7. GT 85-99 High school graduates	183[e]	41	74[e]	150
8. GT 100-115 All less than high school	57[f]	8	25[f]	40
9. GT 100-115 High school graduates	411[f]	75	164[f]	322

Source: Card #2
Columns 39, 47, 55
Questions 26a, 36a, 46a

*Army sub-set

Table IV-9b Veterans Who Received Job Training and Timing of Job Training*

Group	Training	No Training	Training Before or Both	None Before
1. All dropouts	232[a]	25	17[a]	240
2. High school graduates	224[b]	24	17[b]	231
3. High school graduates	492[ab]	59	41[ab]	510
4. Some college	78	4	18	64
5. All greater than high school	103	6	24	85
Matched Groups by Aptitude				
6. GCT 42-50 All less than high school	60	11	3[e]	68
7. GCT 42-50 High school graduates	55	8	6[e]	57
8. GCT 51-59 All less than high school	122	6	11[f]	117
9. GCT 51-59 High school graduates	210	30	16[f]	224

Source: Same as IV-9a

*Navy subset

invest in any younger worker and it may, because of the same probability of being drafted, work against the dropout. This adverse effect occurs because the two probabilities, military service and personal dissatisfaction, are multiplicative, thus reducing the likelihood of a positive return on the specific training investment. The youth and draft liability effect are probably large enough to make the negative but independent dropout effect negligible. This would explain the low level of pre-service training for all.

A corollary to the draft effect is that graduates would receive an over-investment in training after service. Hence, in analyzing the differences in the temporal pattern of training, the draft effect tends to diminish the advantage that the dropout veteran receives from having been in the service ceteris paribus.

The firm's behavior in training does not negate our original hypothesis that the military is a valued substitute for education. It is seen as one of the more cricital aspects in opening up workers' opportunities for advancement in the firm. This suggests that our assumptions about the military service as a surrogate are not wrong and are demonstrably in the right direction, though weaker than originally conceived.

Veteran Unemployment and Education

Whether the military service would alleviate the high unemployment differential between high school dropouts and graduates raised a number of difficult methodological problems. For example, there is the relation between unemployment and labor force participation and whether the immediate post-service period is a vacation or a time when the veteran is out of the labor force, however, not unemployed.

After exiting the service the veteran may collect unemployment compensation just as any other civilian but there are some minor exceptions. If he were discharged and had compensated leave time owed him he would be ineligible to collect the insurance until that accrued leave pay was dissipated. Similarly, if he intended to enroll in school and there was a wait until classes began the veteran would be ineligible for unemployment compensation. Save for these and like problems, there is only a one week wait in most states for veterans, and in a handful of states there is no wait at all.

To probe unemployment experience in the post-service period two question series were asked. In a formal sense the respondents were questioned on whether they had collected unemployment compensation, the number of times, and the duration of each unemployed period.[43] However, it was felt

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[43] The duration is not reported because we have no faith in the statistics. The ratio of the standard deviation to the mean is so high as to make interpretation of no value.

Table IV-10

Incidence of Post-Service Unemployment Among Veterans (Percentages of Respondents)

Group	Unemployed - Did Collect Compensation		Unemployed - Did Not Collect Compensation		Total Incidence of Unemployment	
	Army (I)	Navy (II)	Army (III)	Navy (IV)	Army (V)	Navy (VI)
1. All dropouts	43.1	34.2	22.7	29.6	58.8	55.3
2. High school dropouts	44.0	33.5	25.6	29.4	60.9	54.8
3. High school graduates	36.6	39.0	20.4	22.0	49.7	53.4
4. Some college	22.9	8.5	18.0	14.6	36.4	20.7
5. All greater than high school	27.6	19.0	16.0	18.3	34.4	26.6
Matched Groups by Aptitude						
6. Low Aptitude, all less than high school	40.4	40.8	20.2	28.2	56.4	53.5
7. Low Aptitude, high school graduates	41.5	36.5	25.4	27.0	55.8	58.7
8. High Aptitude, all less than high school	43.7	31.3	27.7	30.5	69.2	56.3
9. High Aptitude, high school graduates	36.8	42.5	18.1	20.4	48.9	56.7

Source: Card 5, Columns 7, 8, 17, and 18; Questions 59 and 60.

that reliance exclusively on compensated unemployment time would give an incomplete picture of veteran unemployment. Interviewees were also asked if there were periods when they could have collected unemployment compensation but did not. The reasons for non-collection could range from neglect to ineligibility but the combination of the eligible periods could clarify the military's aid to dropouts in averting unemployment.

In Table IV-10 the unemployment rates for the servicemen in each category and by level of education are presented. Examining service differences it appears that compensated unemployment is modestly better for Navy veterans for all groups except high school graduates including the high aptitude graduates. As education levels increase,the Navy shows substantially better than the Army. This pattern does not hold when these comparisons are made in the non-covered employment, but reappears in Columns V and VI for total unemployment.

Our immediate problem is seen more clearly in Table IV-11. The unemployment rates of the nine groups are compared internally, to eliminate the service differences observed in Table IV-10. Group 3, the high school graduates, serve as a basis of the comparison for groups 1, 2, 4, and 5. In order to focus more sharply on schooling, group seven is a base for group six and group nine for group eight. Hence,

Table IV-11

Relative Incidence of Post-Service Unemployment Among Veterans

Group	Unemployed - Did Collect Compensation		Unemployed - Did Not Collect Compensation		Total Incidence of Unemployment	
	Army (I)	Navy (II)	Army (III)	Navy (IV)	Army (V)	Navy (VI)
1. All dropouts	1.18	.88	1.12	1.35	1.18	1.04
2. High school dropouts	1.20	.86	1.26	1.34	1.23	1.03
3. High school graduates	1.00	1.00	1.00	1.00	1.00	1.00
4. Some college	.63	.22	.88	.66	.73	.39
5. All greater than high school	.76	.49	.81	.83	.69	.50
Matched Groups by Aptitude						
6. Low Aptitude, all less than high school	.97	1.12	.79	1.04	1.01	.91
7. Low Aptitude, high school graduates	1.00	1.00	1.00	1.00	1.00	1.00
8. High Aptitude, all less than high school	1.19	.74	1.53	1.49	1.42	.99
9. High Aptitude, high school graduates	1.00	1.00	1.00	1.00	1.00	1.00

Source: Derived from Table IV-10; rows 1 through 5 are divided by row 3, row 6 by row 7, and row 8 by row 9.

in the bottom four rows we compare like groups in terms of education and aptitude.

The absence of differences between groups 3, 2, and 1 is most striking. Which service one has been in makes little difference, but having come back from the service equalizes the unemployment of dropout and non-dropout. Only in the group which did not collect unemployment compensation was there a noticeable difference, with the lower educated having a higher rate of non-collection than the high school graduates and this being more pronounced for the Navy. That higher rate for the pre-service dropout Navy veterans who did not collect, coupled with the lower rate for collection overall, suggests that there is something different about the Navy. For example, when the high aptitude groups are compared, in rows eight and nine, these observations become more pronounced. This suggests that aptitude rather than education explains the difference between the groups tied by formal education level. Further it suggests that the Navy appeals to a group with different aptitudes and other characteristics.

This data reaffirms the idea that the achievement of equivalency of high school completion is less beneficial than expected. Put in another way, high school completion with no further education is a low target. When the high school graduates are compared to those who had more education before service, it is clear that there are positive rewards to increased education. For all education levels the Army and the Navy veterans showed less unemployment than the general population, with the Navy's experience far more beneficial.

Our hypothesis is again confirmed, though our optimism is tempered by the relatively poorer performance of high school graduates. A comparison of Table IV-1 with Table IV-11 clearly supports the notion that veterans who are dropouts fare better than all dropouts.

Conclusions

All this evidence suggests that the veteran group of high school dropouts have different work experiences than the non-veterans. They appear to be treated, and behave, like high school graduates. The introduction of aptitude makes this statement more secure. On the other hand, the comparison to non-veteran dropouts is not possible where aptitude is homogenized. Thus, while we suspect that the military has a salutory effect on those who go through it from a low educational level, part of this is a result of the military screening the lowest aptitude. While we are unable to say that broadening the exposure of the dropout group to the military would have a uniformly salutory effect on all dropouts there is enough evidence to support intensive experimentation on high school dropouts. It is unlikely that the lowest achievers will be benefited, and a program should pay careful attention to inter-service differences, i.e. place Army men in Navy training and the reverse.

The most significant of the implications is that measured aptitude may be the variable of greatest policy effect, and that our observations on education reflect the underlying aptitude mix between dropouts and non-dropouts. Aptitude testing at the end of service should be instituted to see if the military doesn't make people better or higher test score achievers. The implications of this for policy are not that all is lost because the people are poor material, but that we require better testing and more tailored programs for dealing with dropouts. Added schooling may be of little value if not underscored with other programs.

Chapter V

JOB SEARCHING OF THE MOTIVATED SUPPLIER

Each respondent was asked whether he had looked for a job related to his military vocation or training. Having already determined what the transfer of training was through the job analysis, we sought information on the potential as well as actual supply of human capital. Job seeking is important as it specifies the intention to find a related job. The analysis of jobs held and their relation to the service is dominated by the group returning to prior jobs. We studied the experience of those veterans who looked for related jobs, and whether their searches were successful or not.

Job Seeking

The job seeking and finding experiences categorized by variables of education, region, and military occupation are shown in Tables V-1, V-2, and V-3. At the bottom of Tables V-2 and V-3, differences previously noted between the services again emerge. The Navy veterans seek related occupations to a greater extent than the Army, though only slightly more than half are in this seeker group. Only 34 percent of the Army veterans sought related jobs.

Despite those sizeable differences in job seeking, when the proportions of job finders to job seekers are compared, the differences between the services are substantially reduced.

Table V-1A Look/Find by Education*

Group	Percent Who Looked	Percent of Those Who Looked Who Found	Percent of Those Who Found Who Took
1. All dropouts	27.1	57.9	68.9
2. High school dropouts	28.2	62.1	64.9
3. High school graduates	37.4	60.3	73.0
4. Some college	50.0	73.8	70.7
5. All greater than high school	27.1	76.1	71.3
Matched Groups by Aptitude			
6. GT 85-99 All less than high school	26.0	65.0	71.4
7. GT 85-99 High school graduates	36.4	49.4	71.8
8. GT 100-115 All less than high school	30.2	63.2	66.7
9. GT 100-115 High school graduates	40.1	58.3	69.1

*Army sub-set

Source: Questions 51, 52, 53; card 4; columns 44, 45, and 46.

Table V-1B Look/Find by Education *

Group	Percent Who Looked	Percent of Those Who Looked Who Found	Percent of Those Who Found Who Took
1. All dropouts	51.0	58.0	81.0
2. High school dropouts	51.6	58.6	80.8
3. High school graduates	65.0	72.3	71.9
4. Some college	26.8	81.8	77.8
5. All greater than high school	21.1	82.6	78.9
Matched Groups by Aptitude			
6. GCT 42-50 All less than high school	50.7	72.2	84.6
7. GCT 42-50 High school graduates	75.8	66.0	54.8
8. GCT 51-59 All less than high school	54.3	47.8	77.8
9. GCT 51-59 High school graduates	63.2	69.5	70.0

*Navy sub-set.

Source: Same as Table V-1A

Some 69 percent of the Navy job seekers found related jobs. For the Army this was 62.2 percent. The percentage of those who sought jobs and ultimately took a related job was about equal in the two services. Comparing the original sample of all veterans, 28 percent of the Navy veterans accepted jobs related to the military, while only 15.9 percent of the Army veterans used their training in a civilian occupation.

Within each service there was considerable variance in job seeking, finding, and taking. Army veterans are more likely to look for and find jobs as their education increases. Aptitude is clearly significant when the high and low aptitude groups with identical education levels are compared. In both cases the dropouts are less prone to look for the service related job, but of those who do, a higher proportion find such jobs. There is considerable homogeneity among the veterans when classified by education in examining the education and aptitude groupings for the ex-serviceman who actually accepted a related job. Once again the aptitude variable dominates in the job taken group.

Navy experience shows some interesting tendencies which are the reverse of those of the Army; job seeking increases with education to the level of high school graduate, but then drops sharply. Clearly, the Navy veterans with some post high school work are the lowest group of related job seekers. The reason for this is unquestionably the high

Table V-2A Look/Find by Region*

Region	Percent Who Looked	Percent of Those Who Looked Who Found	Percent of Those Who Found Who Took
1. North East	41.4	74.0	61.8
2. Middle Atlantic	34.7	64.8	73.6
3. South Atlantic	32.2	62.7	70.3
4. East South Central	27.8	59.1	53.8
5. West South Central	32.3	72.1	83.9
6. Pacific	32.9	62.3	75.8
7. Mountain	46.9	56.5	61.5
8. West North Central	34.7	70.5	65.9
9. East North Central	30.1	54.9	77.1
SMSA	33.2	63.8	74.0
Non-SMSA	33.9	62.0	67.8

*Army Sub-set.

Source: Questions 51, 52, 53; card 4; columns 44, 45, and 46.

Table V-2B Look/Find by Region*

Region	Percent Who Looked	Percent of Those Who Looked Who Found	Percent of Those Who Found Who Took
1. North East	51.1	60.9	73.3
2. Middle Atlantic	55.6	71.0	66.3
3. South Atlantic	54.1	75.5	77.5
4. East South Central	46.2	75.0	66.7
5. West South Central	69.4	64.7	81.8
6. Pacific	55.6	68.2	82.6
7. Mountain	68.6	58.3	64.3
8. West North Central	55.1	70.2	78.6
9. East North Central	54.2	68.2	75.7
SMSA	60.0	68.5	73.8
Non-SMSA	55.3	70.8	75.8

*Navy sub-set.

Source: Same as Table V-2A.

education demand of the Navy veterans. Navy men have little employment experience before service and tend to return to school on discharge. The length of time between departing the service and interview was shorter for the Navy than the Army, a non-comparability which appears here and more noticeably in the effect of education on income, which is discussed in Chapter IV.

With the exception of high aptitude dropouts, the Navy veteran's experience at finding jobs related to his skills is greater than the Army veteran's and is positively related to education. The successful market match was made in largest proportion within the dropout group as a whole, and especially by the lower aptitude group. This suggests that encouraging job seeking among these veterans may prove highly successful.

When regional comparisons are made the Navy veteran's success in job seeking appears, but one immediately discards metropolitaness as a variable. For both Army and Navy there does not appear to be much difference in whether the veteran worked in an SMSA or not. This absence of difference holds for all three categories; job seekers, job finders, and job takers. When regions are compared, sizeable differences emerge.

The ranking and variance of regions between services vary. For example, the Navy veteran's experience at 'job finding', and particularly at 'job taking', is more uniform than the Army veteran's. The southwestern and pacific states scored relatively high in job finding and job taking for both services while Appalachian and mountain states scored relatively low and suggest that the nature of industry is more likely to account for the variance than any characteristic of the veteran. One characteristic of the veteran that does relate directly to the employer is the occupational experience obtained in service.

In Table V-3 the respondents are grouped according to their primary occupations (MOS or NEC). The categories represent clusters of specific occupations that are discussed in Chapter III. There is considerable variance among the groups for both services. In those activities for which there is little _a priori_ convergence, such as combat soldier and boatswain's mate, the degree of interest and use is low. What is surprising is that there is any use at all.

Table V-3 offers a comparison of the differential effect of the specific training in two dimensions. Columns I, III, and V show the proportions of the occupational group interviewed that looked for, found, and took employment. In the low _ex ante_ convergence group, occupational category VIII for the Army and IX for the Navy, measured convergence is lowest. There is considerable uniformity between the Army and Navy in this group. The highest group for the Army, data processors, shows 64.7 percent looking for jobs and

Table V-3a

Look/Find by Military Occupation*

Group	(I) Percent of Total Who Looked	(II) Column I divided by Group 8	(III) Percent of Total Who Found	(IV) Column III divided by Group 8	(V) Percent of Total Who Took	(VI) Column V divided by Group 8
1. Police	34.1	2.2	24.0	2.4	14.1	2.1
2. Data Processing	64.7	4.2	50.0	5.0	42.3	6.2
3. Operative-Construction	29.1	1.9	17.8	1.8	16.7	2.5
4. Operative-Repair	40.6	2.7	26.8	2.7	20.5	3.0
5. Telephone Trades	53.8	3.5	34.5	3.5	25.1	3.7
6. Teamster	25.9	1.7	11.7	1.2	8.3	1.2
7. Esoteric Skills	27.2	1.8	14.6	1.5	6.8	1.0
8. Combat Infantry	15.3	1	10.0	1	6.8	1
9. Duty Soldier	15.4	1.0	5.8	.58	5.8	.85**
10. Clerical	39.3	2.6	22.8	2.3	14.2	2.1
Total Sample	34.0	2.2	21.5	2.1	15.9	2.3

Source: Questions 51, 52, 53; card 4, columns 44, 45, and 46.

*Army subset
**3 observations

Table V-3b

Look/Find by Military Occupation*

Group	(I) Percent of Total Who Looked	(II) Column I divided by Group 9	(III) Percent of Total Who Found	(IV) Column III divided by Group 9	(V) Percent of Total Who Took	(VI) Column V divided by Group 9
1. Operatives	75.6	4.1	46.7	5.1	37.8	4.9
2. Telephone Trades	76.1	4.1	50.0	5.4	31.3	4.1
3. Aircraft Mechanics	58.7	3.2	38.5	4.2	23.8	3.1
4. Teamster	58.9	3.2	44.5	4.8	35.6	4.6
5. Esoteric I (electronic)	72.8	3.9	55.8	6.1	44.4	5.8
6. Esoteric II (mechanical)	46.3	2.5	30.1	3.3	17.6	2.3
7. Weapons	38.8	2.1	29.1	3.2	24.8	3.2
8. Clerical Skills	41.4	2.2	20.7	2.3	17.6	2.3
9. Boatswain's Mate	18.5	1	9.2	1	7.7	1
Total Sample	55.8	3.0	38.5	4.2	28.6	3.7

Source: Same as Table V-3a.

*Navy subset

42.3 percent actually finding them. The Navy does not have a separate data processing group, but the comparable Navy groups - Operatives, Esoteric-Electricians, and Telephone Trades - are the highest seeker groups.

The Telephone Trades is an interesting set of occupations. The equipment is substantially the same and the training for all the services comes from the Army through the Signal Corps. While the Telephone Trades group is high for the Army, by internal service comparison it is much lower, both in seeking and success in finding a related occupation, than the comparable Navy group. Choice of service is definitely not irrelevant for the young man seeking a civilian career through military service.

The esoteric occupations deserve some examination. The choices of specific military specialties derives from the absence of a related civilian occupation in the face of some significant training. The two groups for the Navy, mechanical and electronic, demonstrate the widest differences in transfer, with the mechanical in the Navy much lower than the electronic (includes guidance, i.e. computer equipment). The Army esoteric group is very low and is identical to the combat group. The explanation for this may lie in the narrowness of the skill structure for the Army. The Navy men, more broadly trained, feel that they have a more marketable commodity and find that the civilian market is in accord with this judgment.

Little difference appears between the services in the clerical occupations. Substantial numbers of men from both services looked for civilian jobs but a relatively small number found or took such jobs. Differences between the services in relatively low skill jobs appear in Teamster type occupations. With entry barriers relatively low and civilian pay high, one would think that crossover would be sizeable but this was true only for the Navy.

An occupational category with low transfer is police. While 34.1 percent looked for jobs only 14.1 percent took related jobs. By job analysis criteria the degree of convergence is high, but *ex post* the convergence is quite weak.

The degree to which the low transfer reflects the proportion that sought related jobs suggests that the proportion that looked is a low estimate of the potential available supply. Further detail on this, however, can be inferred from additional survey data.

Job Rewards

Even if the job pursuit were successful it is reasonable to ask whether the game was worth the candle. Only one-half of the Army veterans who took jobs related to their military experience received any tangible rewards based on this experience. The Navy veterans fared better, with three-quarters of them receiving some reward for their service experience. The respondents were interviewed specifically with regard to two types of reward, monetary benefits and job status with an "other" category also available. The differences between the service groups appeared in pay differentials, and it is on these pay rewards that most attention will be placed. There was little intra-service difference in job status rewards.

The Army veteran's reward experiences based upon the education variables (Table V-4) indicate a strong education effect. Dropouts received significantly lower rewards for their experience than high school graduates. This difference becomes even more pronounced when the groups are standardized for aptitude. This is somewhat counter to our earlier analysis of job seeking, but is understandable owing to the high proportion of veterans that returned to former jobs. That is, the post-service rewards may be more accurately ascribed to the prior job experience rather than to the service experience, with perhaps a token reward for the latter.

This complex relation provides an interpretive vehicle for comparing the Navy and Army experiences in post-service benefits. The dropouts who went through the Navy did approximately as well as the high school graduates. When aptitude is held constant the dropout group in the Navy did better than the high school graduates at both levels of aptitude. Only for education groups I and II was the accruement of financial benefits less for the dropouts.

Table V-4A **Benefits to Those Taking Related Jobs by Education (Percent of Respondents)***

Group	Pay	Job Title	No Help and Don't Know
1. All dropouts	25.8	6.5	67.7
2. High school dropouts	29.2	8.3	62.5
3. High school graduates	35.9	16.4	47.7
4. Some college	35.2	13.0	51.9
5. All greater than high school	34.2	16.4	49.3
Matched Groups by Aptitude			
6. GT 85-99 All less than high school	10.0	10.0	80.0
7. GT 85-99 High school graduates	37.0	18.5	44.4
8. GT 100-115 All less than high school	20.0	0	80.0**
9. GT 100-115 High school graduates	33.8	10.3	55.9

*Army sub-set.
**5 observations

Source: Question 54; card 4; column 47.

Table V-4B **Benefits to These Taking Related Jobs by Education (Percent of Respondents)***

Group	Pay	Job Title	No Help and Don't Know
1. All dropouts	51.6	21.0	27.4
2. High school dropouts	50.8	21.3	27.9
3. High school graduates	60.6	16.1	23.3
4. Some college	35.7	7.1	57.1
5. All greater than high school	33.3	13.3	53.3
Matched Groups by Aptitude			
6. GCT 42-50 All less than high school	61.9	14.3	23.8
7. GCT 42-50 High school graduates	56.3	18.7	25.0
8. GCT 51-59 All less than high school	48.2	25.9	25.9
9. GCT 51-59 High school graduates	50.0	15.3	34.7

*Navy sub-set.

Source: Same as Table V-4A.

When the higher education groups are compared to the high school graduates, inter-service differences disappear and an inverse relation of job benefits and education emerges. The more highly educated Navy group receives least from the occupational experience. The relatively short out of service period will tend to produce a negative relation between education and income. This apparent inconsistency with the theory of human capital may be explained by "peculiarities" of men who volunteer for the Navy, in that the immediate post-service period is taken up with an increased investment in human capital by the ex-Navy men. We noted above that the Navy high education group showed a strong education demand after they left the service. We expect that a positive relation of education to income would appear if an appropriate time for the education to pay off were allowed. This could only be tested by an appropriate longitudinal study at some later date.

An examination of Table V-5 confirms some of the earlier geographic analysis. The urban effect is virtually non-existent, as seen by the absence of difference between SMSA or non-SMSA residence. The monetary rewards are greater in non-SMSA's for both services, while the reverse is true for job title benefits. This may indicate more emphasis on formalities in personnel practice in metropolitan areas than elsewhere; for example rigid merit system rules.

Table V-5A **Benefits to Those Taking Related Jobs by Region (Percent of Respondents)***

Region	Pay	Job Title	No Help and Don't Know
1. North East	40.9	22.7	36.4
2. Middle Atlantic	37.6	17.2	45.2
3. South Atlantic	38.5	19.2	42.3
4. East South Central	16.7	0	83.3**
5. West South Central	26.9	15.4	57.7
6. Pacific	36.0	0	64.0
7. Mountain	33.3	11.1	55.5
8. West North Central	27.6	17.2	55.2
9. East North Central	33.3	15.9	50.8

*Army sub-set.
**6 observations

SMSA	33.8	17.1	49.1
Non-SMSA	36.1	10.8	53.1

Source: Question 54; card 4; column 47.

Table V-5B **Benefits to Those Taking Related Jobs by Region (Percent of Respondents)***

Region	Pay	Job Title	No Help and Don't Know
1. North East	54.5	18.2	27.3
2. Middle Atlantic	42.6	16.2	26.5
3. South Atlantic	66.7	13.3	20.0
4. East South Central	66.7	16.7	16.7**
5. West South Central	58.8	11.8	29.4
6. Pacific	51.4	18.9	29.7
7. Mountain	37.5	50.0	12.5
8. West North Central	66.7	15.2	18.2
9. East North Central	57.9	14.0	28.1
SMSA	54.7	20.0	25.3
Non-SMSA	62.7	9.0	28.3

*Navy sub-set.
**6 Observations

Source: Same as Table V-5A.

For ex-sailors, just as there was more homogeneity among the areas in finding and taking jobs related to military skill, so is the reward structure across the country more uniform. The real spread in the proportion receiving benefits is almost twice as great for the Army as the Navy. Oddly, while the west coast was a good place to get a job related to the military, it ranks quite low in producing rewards based on that experience. The inter-service disparity is again clear, as the Pacific, though the worst area for rewards by Navy men, is still better than the best area for Army personnel. The East coast shows just the reverse characteristic, i.e. a lower rate of military related positions, but when such positions are obtained, they seem to involve higher tangible reward.

The primary difference between the services, as seen in Tables V-6 and V-7, was the pay advantage received by the Navy veteran. Some 56.8 percent of Navy men in jobs related to their military skills felt they had received a monetary return for their service experience, while this was limited to only 34.9 percent for the Army. The lowest monetary return in both services (discounting those groups with cell sizes too small to be meaningful) are teamster trades and construction operatives for the Army. We strongly suspect that the civilian wage structure precludes any special payments and that the occupations do not warrant skill differentials of any note.

Table V-6 Benefits to Army Veterans Taking Related Jobs by Military Specialty (Percent of Respondents)

	Pay	Job Title	No Help and Don't Know
1. Police	35.5	9.7	54.8
2. Data Processing	59.2	12.2	28.6
3. Operative-Construction	20.0	6.7	73.3
4. Operative-Repair	31.3	14.6	54.2
5. Telephone Trades	43.8	13.3	43.8
6. Teamster	11.8	17.6	70.6
7. Esoteric Skills	28.6	57.1	14.3*
8. Combat Infantry	35.3	5.9	58.8
9. Duty Soldier	25.0	25.0	50.0**
10. Clerical	25.5	21.3	53.2
TOTAL	34.9	15.1	51.0

*7 observations
**4 observations

Source: Question 54; card 4; column 47.

Table V-7 Benefits to Navy Veterans Taking Related Jobs by Military Specialty (Percent of Respondents)

	Pay	Job Title	No Help and Don't Know
1. Operatives	67.6	8.8	23.5
2. Telephone Trades	53.8	23.1	23.1
3. Aircraft Mechanics	64.0	16.0	20.0
4. Teamster	37.5	18.8	43.8
5. Esoteric I (electronic)	61.4	19.3	19.3
6. Esoteric II (mechanical)	45.8	25.0	29.2
7. Weapons	64.7	17.6	17.6
8. Clerical Skills	54.2	12.5	33.3
9. Boatswain's Mate	50.0	0	50.0*
TOTAL	56.8	17.1	26.1

*4 observations

Source: Question 54; card 4; column 47.

Both the teamster and construction operative fields are characterized by high union activity which supports a relatively inflexible and flat wage structure.

Observed in another connection is the relative homogeneity of the Navy experience compared to the Army. The best occupation in the Army for civilian value is Data Processor. Not only did it show the highest proportion of transfer, but indicated the highest reward by civilian employers. An occupational grouping which yields rewards for both Army and Navy is the telephone trades. The advantage, we suspect, is cumulative. That is, employers recognize the value of the training as a small initial advantage, and then the service experience catalyzes accelerated promotion for men from these military occupations compared to men entering the field _de novo_. Despite this, only one-half the employed veterans have received any significant monetary rewards. The Esoteric-Electronic skills in the Navy, along with weapons systems maintenance, receive high rates of recognition by the employers who have identified the utility of those trained veterans. While we do not have much confidence in the statistics for the "other" Esoteric skills there appears to be low market utilization of the sophisticated training given to the men while in service. The argument that these men get high paying civilian jobs using their military skills appears invalid.

The clerical skills developed in service were recognized by employers, and as usual, there is a larger likelihood of payoff from the Navy experience. Some two-thirds of all Navy men, but only one-half of the Army personnel, in these occupations received some benefits. The benefits were spread equally between job title and pay. In this set of occupations the characteristics of the veterans may be more important than the specific training and work experience. Two variables come to mind that may be extremely important for these occupations: the military's assignment to the clerical field, and the serviceman's decision to leave the service and pursue this occupation. The duties of a man on a clerical job in service are not that different from the civilian, i.e., high convergence exists, so that a reasonable explanation for the use of the skills should lie in the individual veteran's choice to pursue a career.

Police, the most obvious critical skill, have a direct transfer of approximately 19 percent. Only one-half of the veterans able to obtain employment as police received some benefit from the training. Ranked by benefits the police career field was slightly below the mean and only marginally better than the combat skills. Police and combat skills along with operatives - construction, had the lowest impact on job title. The police and combat groups were equal in monetary rewards. One source of the low convergence in the police occupation is an apparent demand block. Thus, while

34 percent of military police looked for a related job, approximately 9 percent received any advantage and only 6 percent indicated receiving a marketable advantage that would appear in income statistics.

Refusal of Occupational Transference

Further light on the marketability is shed by the evaluation of the respondents' reasons for not taking a related job (See Tables V-8 through V-11). That is, our interest is in veterans who looked for and located a job related to their military specialty but where this search did not end in a market clearing. Unfortunately, the Navy group was relatively small and the statistics for them are generally not significant.

Each respondent had a choice of: the wage, the future in the job, the job itself, and an open ended response in evaluating their reason for not accepting the job. Both high school graduates and dropouts indicated low pay as the primary reason for not accepting the job. This is important in establishing both civilian and military policy. For example, 50 percent of Army veterans in the electronic data processing field did not move into a related job because the pay was too low. If the military were to raise military pay levels to meet the civilian competition, then the guide of civilian wage would not necessarily induce soldiers to remain in service but would increase quasi-rents to those who were there.

Table V-8A Reasons for Army Veteran Not Taking A Related Job by Education (Percent of Respondents)

Group	Pay	Future Prospects	Job Itself	All Else
1. All dropouts	28.6	28.6	0	42.9
2. High school dropouts	30.8	23.1	0	46.2
3. High school graduates	50.0	18.8	8.8	22.5
4. Some college	42.9	23.8	4.8	28.6
5. All greater than high school	42.9	17.9	14.3	38.1
Matched Groups by Aptitude				
6. GT 85-99 All less than high school	0	50	0	50*
7. GT 85-99 High school graduates	23.1	15.4	23.1	38.5
8. GT 100-115 All less than high school	33.3	33.3	0	33.3**
9. GT 100-115 High school graduates	51.5	18.1	9.1	21.2

*4 observations
**6 observations

Source: Question 53; card 4; columns 48-49.

Table V-8B Reasons for Navy Veteran Not Taking A Related Job by Education (Percent of Respondents)

Group	Pay	Future Prospects	Job Itself	All Else
1. All dropouts	73.3	6.7	20.0	0
2. High school dropouts	78.6	0	21.4	0
3. High school graduates	61.8	23.5	14.7	0
4. Some college	0	0	50	50*
5. All greater than high school	0	0	50	50*
Matched Groups by Aptitude				
6. GCT 42-50 All less than high school	50	25	25	0*
7. GCT 42-50 High school graduates	77.8	22.2	0	0**
8. GCT 51-59 All less than high school	88.9	0	11.1	0**
9. GCT 51-59 High school graduates	64.3	21.4	14.3	0

*4 observations
**9 observations

Source: Same as Table V-8A.

Table V-9A Reasons for Army Veteran Not Taking A Related Job by Region (Percent of Respondents)

Region	Pay	Future Prospects	Job Itself	All Else
1. North East	50	25	8.3	16.6
2. Middle Atlantic	43.8	25	9.4	21.8
3. South Atlantic	76.9	15.4	0	7.7
4. East South Central	14.3	42.9	14.3	28.5
5. West South Central	50	0	0	50*
6. Pacific	37.5	12.5	25	50**
7. Mountain	66.7	0	16.7	16.7***
8. West North Central	37.5	6.3	12.6	43.6
9. East North Central	43.5	26.1	4.3	26.1

*4 observations
**10 observations
***6 observations

Source: Question 53; card 4; columns 48-49.

Table V-9B Reasons for Navy Veteran Not Taking A Related Job by Region (Percent of Respondents)

Region	Pay	Future Prospects	Job Itself	All Else
1. North East	50	0	25	25*
2. Middle Atlantic	34.4	15.6	6.3	43.8
3. South Atlantic	23.1	0	0	76.9
4. East South Central	33.3	0	0	66.7**
5. West South Central	100	0	0	0*
6. Pacific	9.1	9.1	9.1	72.7
7. Mountain	0	0	28.6	71.4***
8. West North Central	9.1	18.2	0	72.7
9. East North Central	40.9	4.5	9.0	45.5

*4 observations
**3 observations
***7 observations

Source: Same as Table V-9A.

Table V-10 **Reasons for Army Veteran Not Taking A Related Job by Military Specialty (Percent of Respondents)**

	Pay	Future Prospects	Job Itself	All Else
1. Police	36.4	27.3	9.1	27.3
2. Data Processing	58.3	16.7	8.3	16.7
3. Operative-Construction	0	50	0	50*
4. Operative-Repair	47.1	17.6	11.8	23.5
5. Telephone Trades	50	33.3	0	16.7*
6. Teamster	0	25	0	75*
7. Esoteric Skills	50	12.5	0	37.5*
8. Combat Infantry	28.6	0	14.3	57.1*
9. Duty Soldier	100	0	0	0*
10. Clerical Skills	14.8	21.9	9.4	25
Total	46.3	19.5	8.1	26.1

*Under 10 observations

Source: Question 53; card 4; columns 48-49.

Table V-11 Reasons for Navy Veteran Not Taking A Related Job by Military Specialty (Percent of Respondents)

	Pay	Future Prospects	Job Itself	All Else
1. Operatives	0	0	25.0	75.0*
2. Telephone Trades	33.3	22.2	11.1	33.3*
3. Aircraft Mechanics	40.0	20.0	13.3	26.7
4. Teamster	55.6	11.1	0	33.3*
5. Esoteric I (electronic)	30.4	0	8.7	60.9
6. Esoteric II (mechanical)	37.5	12.5	0	50
7. Weapons	0	0	0	100*
8. Clerical Skills	83.3	0	16.7	0*
9. Boatswain's Mate	0	50	0	50*
Total	29.6	8.3	7.4	54.7

*Under 10 observation.

Source: Question 5 card 4, columns 48-49.

Similarly training courses must be tailored to affect either the actual productivity of the skilled veteran, his income preference, or the perceived productivity as viewed by the employer.

By any consideration the Navy experience is more widely accepted and rewarded than the Army. Both those seeking jobs and potential employers recognize a difference between services. Policy designed to effect crossover should deal on two fronts - the skill mix available from the military and the recognition and reward by the employing organizations. A program to upgrade the Army veteran to the Navy level would possibly only succeed in achieving the Navy's moderate success with crossover. Employer programs must take over from there. But these scratch the surface - the largest bulk of training goes to the men who never looked for a related job and it is to their decision process that we turn.

Chapter VI

BARRIERS TO USE OF MILITARY EXPERIENCES

The detailing of the reasons for veterans' not using the skills learned in services, or not seeking related vocations to use the skills, is critical to policy formation. The barriers to surmount, and the impediments to job mobility, must be identified if the policy is germaine and not just traditional. New vocational training courses, in or out of service, are not particularly useful if the difficulties are demand-based or in the nature of the job. The veteran's use of his training requires his effort as a supplier along with the decision of a demander to use that service. Most programs and plans in manpower are supply-oriented. It has been our feeling that the reasons for non-use, however, are demand-based.

Job Seeking

Meaningful categories are needed to catalogue the reasons why veterans did not look for jobs or further training related to their job experience. The partition classifications had to fill the dual requirement of relevance to the veteran and meaningfulness to the analyst. The Military Training Study experiment settled on an open-ended question with a set of pre-codes to aid the interviewers. While the list of codes was extensive, the interviewers had a tendency to use the "other" category supplemented with annotations. That fact, coupled with the large number of precoded categories, caused us to post-code. The object of post-coding was to collapse all of the determined possibilities into a number of discrete categories capable of some interpretation.

Six categories substantially filled the range of complaints: compensation items, prospects in the job, the absence of a related civilian occupation, the absence of a job in the area where the veteran wanted to be, the job itself and a catch-all category. It was anticipated that compensation items would be the primary reason for non-transfer, and specifically, vis-a-vis convergent civilian occupations. Alternatively the young age of the men, as well as their low pay in service, would reinforce a low time horizon. This would emphasize immediate monetary returns as opposed to long run potential.

The absence of a related job in civilian labor markets, it was hypothesized, depended on the veteran's market perceptions. It was assumed that the higher the level of education and measured aptitude, the lower would be the barriers to applying the skills acquired in the military. This is a natural barrier to transfer and does not lead to policy prescriptions. On the other hand, geographic imbalances in the availability of related jobs would indicate policy variables such as a subsidy to increase labor or industry movement, as compensation deficiencies point toward raising wages as a way of augmenting transfer.

Those who were classified as not liking the "job itself" may be in this category for a number of reasons. In one dimension, the job is irrelevant other than as work associated with the military experience. Some veterans do not want to do anything in civilian life that relates to their time in service. Other factors in not liking the "job itself" include the physical and mental requirements of the job, or the environment of the work. In any event, this group should be considered outside the available transfer category by any known policy shifts. The "other" category-also falls into this domain of nonavailability for policy purposes. It would take a highly selective and detailed study to determine what could be done to influence the potential transferability of the training from these groups.[44]

Non-transfer and Education

There appears to be considerable similarity between the services in the reasons for not looking for related jobs. In both services, the pay and long run considerations were of relatively low concern (Table VI-1). For Army

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[44] The specifics of policy to alter mobility could be determined if the research appeared warranted. This would be reasonable for some critical skills. The input criteria to the military occupation affects the alternatives open to the veterans and requires a selective policy and research approach toward increasing transfer.

Table VI-1A Reasons for Army Veteran Not Looking for a Job Related to Military Experience by Education (Percent of Respondents)

Group	Pay	Future Job Prospects	Job Itself	No Related Job	No Job In The Area	Not Elsewhere Classified
1. All dropouts	13.4	8.6	24.1	28.9	8.0	17.1
2. High school dropouts	13.6	7.9	24.3	28.6	8.6	17.1
3. High school graduates	14.6	8.9	29.2	21.1	5.2	21.0
4. Some college	13.6	8.2	29.1	23.2	5.0	20.9
5. All greater than high school	15.2	10.8	28.9	20.1	3.5	21.6
Matched Groups by Aptitude						
6. GT 85-99 All less than high school	12.5	10.4	22.9	27.1	8.3	18.8
7. GT 85-99 High school graduates	13.4	6.0	31.3	23.9	7.5	17.9
8. GT 100-115 All less than high school	16.3	7.0	23.3	34.9	7.0	11.6
9. GT 100-115 High school graduates	14.4	8.5	27.1	25.0	4.7	20.3

Source: Question 57; card 4; columns 52-53.

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Table VI-1B Reasons for Navy Veteran Not Looking for a Job Related to Military Experience by Education (Percent of Respondents)

Group	Pay	Future Job Prospects	Job Itself	No Related Job	No Job In The Area	Not Elsewhere Classified
1. All dropouts	9.1	9.1	19.0	30.6	24.0	8.3
2. High school dropouts	9.6	9.6	18.3	29.8	22.3	7.4
3. High school graduates	18.1	8.8	24.9	17.6	22.8	7.8
4. Some college	16.7	18.3	21.7	20.0	10.0	13.3
5. All greater than high school	17.4	17.4	24.4	15.1	12.8	12.8
Matched Groups by Aptitude						
6. GCT 42-50 All less than high school	9.1	3.1	21.2	21.2	42.4	3.1
7. GCT 42-50 High school graduates	26.7	6.7	6.7	20.0	33.3	6.7
8. GCT 51-59 All less than high school	8.8	10.5	19.3	35.1	14.0	12.3
9. GCT 51-59 High school graduates	18.0	9.0	18.0	25.8	23.6	5.6

Source: Same as Table VI-1A.

veterans, there was considerable homogeneity among education groups in their concern for monetary rewards. The Navy veteran group offers a very different picture. The low education Navy veteran is less interested in the financial factors, with less than ten per cent showing concern for this. Education does influence the income expectations and for ex-Navy men pay is slightly more important than it is for the Army group.

The results are somewhat surprising, as they indicated that the elasticity of supply from the service to related jobs may be quite low. If the percentages were substantially larger, one would hypothesize that for any increase in the civilian wage, more veterans would be interested in occupational transfer. Alternatively, what this low interest in wages may imply is for the age and the specific occupation groupings, the range in wages may be perceived to be relatively low so that other obstacles to transfer come to mind.

The job potential in these occupations appears to be trivial to all categories of Army and Navy veterans. While the effects of aptitude and education are weak, they are in the expected direction. That is, a greater interest in the future is expressed by those with higher measured performance. An example of this generalization is the well-educated Navy veteran. We are already aware that this group is a high demander of education, an indication of long planning, and this is reinforced by these results. The young man out of high school who chooses the Navy for his service and then returns to the civilian is obviously a different type person than the Army Regular or draftee.

In the categories of the "job itself," Army men were obviously less content. They did not "like the work" to a greater degree than the Navy veterans. This may be due to the environment or the way that the services organize the jobs. But, for both service groups, the higher the education, the lower the satisfaction with the job.

It is useful to look at job satisfaction jointly with the veterans' appraisal of relatedness. In both services, the degree of perceived use is directly related to education. Generally the more educated men are placed in jobs which require their advantaged background, and we suspect that they are better able to see the bridge to the civilian. This perception of relation runs counter to their evaluation of whether they like the job itself. One might conclude that putting the apparently less able in military jobs would enhance transfer; this may only be the case if a better placement service were available to show the veteran where he could work.

The group destined for continued difficulty is the high aptitude dropout. For both services, this group has the highest negative factor in the evaluation of relatedness to a civilian job. Special counseling programs might be initiated to help this group adjust to the civilian economy. The two streams of data on the job itself and job availability would tend to support the notion that the rating of the job itself is not a function of whether the job may be used in gaining civilian employment.

The Navy veterans demonstrate some difference from the Army in their overall relation to the job structure. For dropouts, the perceived relation is almost the same in both services. The relation improves for both services with education, with the Navy improving somewhat faster. We had expected the education effect, but thought that the Navy veterans, with a wider occupational base than the Army, would have perceived a more apparent "fit" even for the less able men, i.e., the lower occupations. It may be that the Army occupations are perceived as not fitting because they are too narrow and the Navy because they are too broad or not well understood. The military occupational structures in the long run should be regarded as a variable if there is a desire to link military and civilian manpower policies.

The degree of relation is subject to the geographic location of the veteran, i.e., the industry mix in the area where he lives. The barrier of no related occupation is an abstract notion, but we also see that the geographic factors vary widely between services. To the Army veteran, the absence of a job in the area was not a problem, yet the Navy veteran feels that the geographic barrier is quite severe. The Navy variance in the geographic barrier is very high, with the effect inverse to the level of education. The low aptitude Navy men are considerably disadvantaged, so they think, by their location. With area so important, we turn to an examination of the problem of why veterans don't look for related jobs on a regional basis.

Residence and Job-Seeking

In every area of the United States with the exception of New England, the Navy veterans feel that they have considerable difficulty finding a service related job locally (Table VI-2). Part of the apparent influence of geography is the tendency of Navy veterans to think that there are related jobs, but not in their area. If this were true, we would expect to find variance among the nine Census areas. In fact, in all regions, few service related jobs were found to be available. If all areas, including coastal sections, indicate that the region has no related jobs, one can only conclude that it is the Navy job structure and not the fault of the region. Columns 4 and 5 of Table VI-2 are collapsed to form VI-3. The results indicate the Navy veterans perceive less ability to match military jobs with civilian occupations. Whether on the basis of Census region

Table VI-2A **Reasons for Army Veteran Not Looking For a Job Related to Military Experience by Region (Percent of Respondents)**

Region	**Pay**	Future Job **Prospects**	Job **Itself**	No Related **Job**	No Job In **The Area**	Not Elsewhere **Classified**
1. North East	11.3	12.9	22.6	22.6	8.1	22.6
2. Middle Atlantic	15.8	10.1	30.2	19.8	4.1	19.8
3. South Atlantic	13.3	9.2	35.8	17.5	4.2	20.0
4. East South Central	14.5	12.7	23.6	21.8	5.5	21.8
5. West South Central	11.2	4.5	30.3	20.2	10.1	23.6
6. Pacific	12.9	9.9	28.9	20.9	5.9	21.9
7. Mountain	13.6	9.1	31.8	18.2	9.1	18.2
8. West North Central	1$\overset{3}{8}$.8	8.3	24.8	27.5	5.5	20.2
9. East North Central	16.1	9.1	25.8	25.2	3.9	20.0
SMSA	14.4	10.1	28.7	22.3	3.8	20.7
Non-SMSA	15.1	7.8	27.4	21.2	8.3	20.2

Source: Question 57; card 4; columns 52-53.

Table VI-2B Reasons for Navy Veteran Not Looking for a Job Related to Military Experience by Region (Percent of Respondents)

Region	Pay	Future Job Prospects	Job Itself	No Related Job	No Job In The Area	Not Elsewhere Classified
1. North East	14.3	4.8	38.1	19.0	4.8	19.0
2. Middle Atlantic	14.7	12.7	25.5	18.6	22.5	5.9
3. South Atlantic	8.9	8.9	22.2	33.3	22.2	4.4
4. East South Central	14.3	0	0	7.1	28.6	50.0
5. West South Central	13.3	6.7	20.0	33.3	26.7	0
6. Pacific	23.1	13.5	21.2	19.2	13.5	9.6
7. Mountain	18.2	18.2	18.2	18.2	27.3	0
8. West North Central	10.2	10.2	20.4	20.4	26.5	12.2
9. East North Central	17.6	11.0	24.2	19.8	20.9	6.6
SMSA	15.9	12.2	23.6	21.3	18.9	8.1
Non-SMSA	13.5	6.7	21.2	20.2	26.9	11.5

Source: Same as Table VI-2A.

Table VI-3

No Relation of Civilian to Military Job
(Percent of Respondents)

Region	Army	Navy
I. North East	30.7	23.8
II. Middle Atlantic	24.1	41.1
III. South Atlantic	21.7	55.5
IV. East South Central	[illegible]7.3	35.7
V. West South Central	30.3	60.0
VI. Pacific	26.8	32.7
VII. Mountain	27.3	45.5
VIII. West North Central	33.0	46.9
IX. East North Central	29.0	40.7
SMSA	26.1	40.2
Non-SMSA	29.5	47.1

Source: Derived from Table VI-2A and VI-2B, columns 4 and 5.

or metropolitanness, the Navy has an apparent problem. The Army veteran, on the other hand, does not look upon geographic imbalance as critical at all.

The pay problem is quite uniform across both services and throughout the country. Only for the West Coast Navy veterans does pay become the prime reason and then only for one-fifth of the survey. In other characteristics of the job, such as its prospects, the lack of concern on the part of veterans again arises. In both these subject fields, there is little variance between SMSA and non-SMSA groups. This contrasts with the above findings on region, but in a direction expected. The greater diversity in an SMSA affords the returning veteran added opportunity to use his military skill. The most significant possibilities for civilian use affecting transfer apparently relate to the military occupation.

Military Classification and Transfer

In Table VI-4, the occupational groups in the services are the basis for judging why the related civilian jobs were not sought. The variance in the occupations is not small and the cell reliability is not an insignificant problem. What this statistical analysis does indicate is that policy to augment transfer would have to be adjusted on an occupation-by-occupation basis, with detail required for each group.

The attempt to recruit police is severely handicapped

Table VI-4A Reasons for Army Veteran Not Looking for a Job Related to Military Experience by Military Specialty (Percent of Respondents)

Group	Pay	Future Job Prospects	Job Itself	No Related Job	No Job In The Area	Not Elsewhere Classified
1. Police	13.6	6.1	55.3	4.5	0.8	19.7
2. Data Processing	18.4	7.9	18.4	13.2	7.9	34.2
3. Operative-Construction	16.8	12.0	34.4	11.2	4.8	20.8
4. Operative-Repair	19.4	10.1	32.6	12.4	4.7	20.9
5. Telephone Trades	22.2	2.8	25.0	5.6	2.8	41.7
6. Teamster	5.9	11.8	33.8	18.4	11.8	18.4
7. Esoteric Skills	6.9	12.5	11.1	36.1	20.8	12.5
8. Combat Infantry	7.4	5.8	11.6	64.7	2.1	3.4
9. Duty Soldier	11.9	4.8	31.0	26.2	9.5	14.3
10. Clerical Skills	20.0	11.0	26.0	14.0	1.0	28.0

Source: Question 57; card 4; columns 52-53.

Table VI-4B Reasons for Navy Veteran Not Looking for a Job Related to Military Experience by Military Specialty (Percent of Respondents)

Group	Pay	Future Job Prospects	Job Itself	No Related Job	No Job In The Area	Not Elsewhere Classified
1. Operatives	4.5	9.0	36.4	9.0	22.7	18.0
2. Telephone Trades	33.3	8.3	25.0	16.7	8.3	8.3
3. Aircraft Mechanics	11.1	13.3	28.9	8.9	26.7	11.1
4. Teamster	44.7	18.4	18.4	7.9	0	10.5
5. Esoteric I (electronic)	11.5	9.6	30.8	15.4	25.0	7.7
6. Esoteric II (mechanical)	9.7	1.4	23.6	22.2	29.2	13.9
7. Weapons	11.9	8.5	13.6	47.5	15.3	3.4
8. Clerical Skills	19.6	25.5	29.4	9.8	7.8	7.8
9. Boatswain's Mate	7.8	5.9	9.8	31.4	37.3	7.8

Source: Same as Table VI-4A.

by the nature of the job. Only in the smallest way is there any indication that transfer is not actually possible, with only 5.3 percent of the MP veterans indicating no related jobs as the problem. Pay is less of a problem than expected. The job prospects, except for personal risk, are quite high in police work and reflected in the low proportion concerned about it. But 55.3 percent do not like the job. This reason for non-transfer was chosen by police in greater proportion than any other occupational group. If the civilian police are to tap the military for added manpower resources, changes must be made in the civilian occupation.

As expected, the combat skills for both services show up strongly in the "no relation" category. Weapons and Boatswain's Mate, the Navy occupations with more emphasis on shipboard duties, and Combat-Infantry all show a high degree of "no relation." The Army categories demonstrating a higher proportion of this response probably reflect the difference in occupational structure, along with combat emphasis.

The absence of related occupations makes a strong showing in the three esoteric skills. These high investment occupations are ones frequently used to support arguments for raising service pay. In each case, pay and the future in the job are of relatively low concern. In the two Navy categories over 40 percent indicated that they believed they could find no related job, and, in addition, a very high proportion did not like the job itself. These groups, we suspect, are not concerned about the relative military-civilian pay structure and are unlikely to respond to pay movements. They are a high-aptitude group who are more concerned about their futures than about using the specific capital invested in them by the military. Their behavior reflects maximizing rules and not irrational behavior. The Army veterans trained in sophisticated skills have a more positive attitude toward their jobs than the Navy veterans, but they still cannot see that the experience is relevant for the civilian labor market.

This evidence runs counter to the experience of the veterans who looked for a related job. This residual group may have had a markedly different set of job experiences or they may have substantially different personal characteristics. The utilization of this specific capital by the economy would require both careful job evaluation and counseling of the exiting veteran.

The telephone trades show up as expected. For both services, pay is a considerable negative factor, while job prospects are of very low concern. The civilian industry is noted for low entry wage rates, high employment certainty, and a system of wage increases that favor the long-term employee. Two peculiarities appear for this trade. In the Navy, 25 percent indicate no civilian jobs existed like the ones they had in service. This, we suggest, is a failure of communications and counseling. On the other hand, 41.7 per cent of the Army veterans are found in the N.E.C. group. The use of this category is the highest of any occupation and may indicate some complex problems in the trade. We suspect that there is little policy meaning in the lack of knowledge of related civilian jobs as these occupations are not in short supply and the need to fill job vacancies can be met from normal channels.

The performance of these occupational groups makes us confident about the reliability of this survey data. The wage and job prospects broke as expected, based on civilian occupations.

What is surprising is that some 25 per cent of the Navy veterans who served in the telephone trades suggest that there are no occupations related to their training. The number who did look for jobs, as well as an evaluation of training in job experience for this occupational group, would indicate a fairly high utilization of these skills in the civilian economy. The absence of this awareness may indicate that the training of these individuals precludes their being hired at the level that their experience would dictate. They may see themselves at the journeyman's level while the civilian firms may conclude these veterans have demonstrated an aptitude for the work and thus would have potential within the firm. Therefore, the absence of a job means an absence at the specific hiring level, rather than the total absence of a position. For the Army veterans, fewer than ten per cent claim that related jobs do not exist. It may be that the Army group's lower percentage again reflects the degree of specification and training which they receive. For example, the Army man is trained on a specific instrument or specific task and may be hired at the entry rate which the veteran feels is appropriate to his level.

A somewhat disconcerting statistic is the high proportion of veterans in the telephone trades whose reasons for not looking were not able to be categorized in the five primary categories and were placed in the "not elsewhere classified." The proportion place in this category is considerably out of line with any other occupational group and may indicate some peculiar problems for the Army veterans in the telephone field. One problem that we might mention is the character of organization of the firms. That is, that the various telephone companies are more like the military in their organization and that this is an underlying cause of the failure of the veterans to have an interest.

An occupation for which there is apparently great interest, in terms of available jobs and relatively high wages is data processing. Data processing in the Army has no exact counterpart in the Navy, but the Group V Esoteric Skills (Electronic) is a proxy for it. In the Army group, the greatest reason for not seeking jobs was the "not elsewhere classified" category. This might also indicate the bureaucratic nature of jobs regardless of the employer. Some 20 per cent of the Army veterans considered that pay was their reasons for not transferring to this field, with a scant 8 per cent being concerned about the future. The characteristics of the job did not appeal to 18 per cent and some 13 per cent thought that there were no related jobs. This occupation was one of the highest for transfer and it is difficult to conceive how an individual who had been trained in this area in the military could consider that there were no related occupations. The choice of this option of not looking for a job could indicate more about the job seekers than about the characteristics of the occupation. The Navy Group V indicates 40 per cent who were disinterested or did not think that there were related occupations. This seems excessively high but as in the case of the telephone trades it may indicate barriers to related jobs at particular levels rather than barriers to general appointment.

In the operative category, that is III and IV for the Army and I for the Navy, the primary reason for not seeking a related civilian job was the characteristic of the job itself. Over 30 percent of the veterans in each of these groups indicated that the job was the primary concern. Approximately 20 percent in each group were not able to identify any occupation that coincided with the five specific categories. These civilian type occupations were chosen because there appeared to be a relatively high demand as well as some degree of unionization. These are classic blue-collar skills, and it is interesting that these are occupations that might be characterized by relatively low status. It is difficult to explain why there was not more attraction to these occupations. It is assumed that characteristics like job exclusion would have been in the "not elsewhere classified" grouping. An interpretation of this material would be that these construction operatives were men who had experience prior to entering the service, and chose not to return to their pre-service type of job. There is a tendency for people in Group III to receive direct duty assignments based upon their prior job experience.

In looking at Group VI for the Army, the Supply and Warehouse, we have a group of occupations associated with the Teamsters Union. The characteristics of these occupations are relatively high wages for moderate skill, and an organization which is open to different educational levels and racial groups. The work, however, is generally of an unskilled or semi-skilled category and the occupations would not be considered high status. Only 6 percent of the people in this area indicate that wages are their reason for not looking for a job. This is clearly in line with the high wage pattern in that industry. Nearly 12 percent, however, were concerned about the future in the job. This would appear to be a relatively high rate considering the size of the number who were concerned about pay.

A relatively high proportion, nearly 34 percent, of the warehousemen indicated that they did not care for the job itself. This goes along with the common conception of the work in this occupation. The 29 percent who could not find related jobs again indicates something peculiar about the work in the field, as we are aware that there are a large number of jobs in these activities. The Navy Warehousing group is obviously a very different category than the Army. Nearly 45 percent of the Navy men indicated that pay was their primary reason for not looking for a job in this activity. This implies, along with the 18 percent who thought about the future, that they are a different type. They are individuals with high-income job expectations for which the general stores and record-keeping, which is associated with Teamsters' warehouse work, is not agreeable.

Two service occupations were included in our survey: Clerical, Group X for the Army; and Business and Service for the Navy, Group VIII. For both groups, the characteristics of the job appear to be a significant deterrent. Nearly 30 percent of the Navy veterans and 26 percent of the Army veterans indicated that the job itself was a reason for their not seeking employment. Again, for both services, approximately 20 percent indicated that the pay was a reason for not looking. It is interesting that while 11 percent of the Army veterans with a clerical background thought that the future or the absence of job prospects was a reason for not looking, the Navy rate was double this. Again, we suspect that this indicates something about the characteristics of Navy veterans, rather than the characteristics of the occupation. A relatively low percentage of both the Army and the Navy veterans considered that there were no related jobs.

It has sometimes been suggested that the clerical skills be given to relatively disadvantaged individuals going into the service, as these are jobs which could be performed afterwards by people in the civilian field. We do not feel that the data we have here would be an adequate test of this hypothesis because we are working with a clerical group that would be a relatively high education category. It might very well be that if we dealt with a population with the same job experience, they might have very different attitudes toward the job category itself.

Conclusion

We are now able to compare the attitudes toward the jobs of individuals who looked and who didn't look for related civilian occupations. What is most striking is that there is a large percentage of individuals who can state that there appeared to be no civilian relationship to their military background. This contrasts with the individuals in the preceding chapter who did look for, but in many cases found, related civilian jobs. All of this points to the absence of information or goodness of fit in the operations of the market.

Despite this fact, there appears to be a very significant number of veterans who are not interested in pursuing any job like the one they had in the military. The job itself stands as a barrier. It would be premature at this point for vast resources to be used in trying to determine how to change the job both in the military and the civilian field unless there was a very specific reason for undertaking such an activity. This might be the case for an occupation like police or, one that we did not study here, medical activities where there appears to be some significant unmet needs.

The first examination of the data indicated that pay was quite critical in the reasons for non-transfer. We would no longer hold this position. While it is true for some activities, those where it is highest are occupations for which there is relatively little concern about drawing people in through some elasticity response. All that this points to is that there are some significant problems in occupational crossover and that in order to augment the current rate of utilization of skills from the military, one would have to devise specific labor market programs which will be discussed below. After the question of the labor market adjustment, there is then the very difficult question of how one can change the internal characteristics of jobs both in the civilian and military fields to make them more attractive for individuals who have received training in them.

Chapter VII

CONCLUSIONS

Diversity is the hallmark of the military manpower structure. The organizational differences of the manpower systems of the services is perceived in the responses to the problems investigated. Not only are the services different in the degree of specialization which they give to people, but the returning veteran has a different set of attitudes, depending upon the service as well as the occupation in which he served. This may be a result of differences in the input to the services, the overall character of the service, and/or the specific occupation. Another characteristic which implies diversity is the variance within each service among the occupations. In each occupation there is a range of interest in relating military service to a civilian occupation. Therefore, any attempt to alter the flow of skills must be directed on a highly specific basis. Overall programs to aid transition are likely to be ineffective and wasteful of resources.

Review of the Findings

We can now state that the original hypothesis about the relatively low order of transition was correct, although results are understatements of the transfer as shown in Appendix D. The survey indicated that 15.9 percent of Army veterans used their military training, while 28 percent of the Navy veterans did. Not only was there a relatively low rate of utilization of the skills, but we found that the market did not work effectively in aiding those veterans who were interested in using their service experience. For veterans who did look and find jobs related to their military experience, we inquired about benefits received and whether, in fact, these were attributable to the military experience. We found half the Army veterans received no benefit at all as a result of their military experience. They said that there were no monetary or job characteristic rewards that were resultant from their military job experience. On the other hand, there were a number of veterans who indicated that they did receive some reward. In examining the issue of whether there was a benefit or, for future policy, whether there would be a benefit from increasing crossover, we examined the extent to which income was positively affected by serving in and looking for a related military occupation. In previously cited work (see Appendices E and F) we have strong indications that where income is affected the source of the income alteration is not directly due to the military experience. Rather, it is the military that employed the prior skills of servicemen. In Appendix E, Jurkowitz identifies the source of the positive income effect as the prior experience in an occupation. This resembles the generalized phenomenon of an institution taking credit for what would have happened if it had not been there at all. We were not able to discern whether an individual who had gone through the service and then returned to a prior occupation would, in fact, have done better by staying in that occupation and not having had the military exposure. We can conjecture that, in fact, an individual would be advantaged in general by staying in the civilian sector. We believe that there are probably some geographic factors which would make it more beneficial for a person to enter the military to receive additional training.

The income experience which is analyzed in the appendices relating to the Army, unfortunately, does not have an appropriate counterpart for the Navy. Analysis of the Navy income material was not pursued owing to difficulties with the data. We can report that the military experience does not appear to have a strong, or even a positive, effect on income for the Navy veteran. This, we believe, is explainable by the relative difference in civilian life between the Army and the Navy veterans. For the most part, the Navy veteran had been out of service for a relatively shorter period of time due to the extended obligation in direct service. In addition, the Navy veteran tended to return to school. Plainly the Navy veteran has a marked interest in additional education compared to the Army. The result was that income, when examined, showed negative correlation to education and aptitude. Our problem was that the time required to get the effect of the education and the training was not long enough to analyze the impact of the Navy experience. A different research design, calling for a prolonged series of longitudinal studies over a considerable period of time, would be required to solve this problem.

There was less difference in the attitudes of employers towards dropouts and high school graduates than had been anticipated. This was perhaps due to some semi-concealed effects of the uncertainties in the Selective Service System. Employers appeared to be loathe to make specific investments in young men because of the perceived low likelihood that they would return to their jobs. One of the strongest results of the study was that pre-service employment dominates post-service occupational choice. For most men, the service was a period of interruption in their normal occupational pursuits, but did not result in any rupture of the flow of activity. The return to prior activities was strongest in the Army where the men entered the military at a somewhat later age. The attraction of returning to former employers, due to knowledge of the specific job, certainty of the job, monetary benefits, and/or the general dislike for the military occupation, resulted in most Army veterans returning to prior employment and not considering a related military occupation.

In many occupations in the military the serviceman had a revulsion for the work and a sense that there were no related occupations. However, the Navy veterans tended to be education seekers. One might conclude that, in the long run, there would be a greater tendency for Navy men to look for some occupation related to their military skill. Clearly, there is a slightly larger transference from the Navy and this may very well be due to the sort of training that the Navy men receive as well as the individuals who volunteer for that service.

Our hypotheses about the attachment to occupation as a function of age appear to be substantiated. The younger Navy men are less attached to what they have done formerly and appear to be more mobile in terms of occupation status. The Army men entering service at an older age are more rooted in their prior occupations. The effect of reversing the draft age and altering the Selective Service System may be quite strong in affecting the rate of transfer in the future.

Neither the broad census areas nor the difference between metropolitan and non-metropolitan areas are very important and this is not as anticipated. Other factors, such as the need to return to occupation, job certainty and education demands, may far outweigh the regional differences. We can conceive, however, that there are important differences for some occupations. Our analysis of the military police and some examination of the structure of medical professions indicate that there are considerable variances in demand across the country.

We now turn to policy suggestions which arise from our analysis and to suggestions about future research on the subject. In many ways, our work was a disappointment because the occupational data we obtained was inappropriate. Despite this, we feel that we have moved the research involving military manpower to a more sharply focused field.

Policy Recommendations

The low level of transfer of specific capital need not necessarily cause concern though it appears that human capital lies fallow. Low achievers in the military and civilian parts of the public and private sector are not making use of this resource. Whether policy should be altered to influence crossover irrespective of occupation, or limited to critical occupations in the public and/or private sector is an open question. We feel that there is weight in favor of interference when critical skills are involved.

Irrespective of cost, it is substantially beyond question that the military does train men in skills which in part or whole are substantially identical to civilian occupations. *Ex ante* convergence does exist and the ways this can be converted into *ex post* convergence are suggested in the following recommendations. The breadth of these proposals emerge from our perceptions of the complexity of the problem. A neat, single solution would be ineffective and could be counterproductive.

Information Clearing. Both public and private employees are substantially ignorant of the training and experience of veterans. Neither the public labor market counselors nor employers, singly and in association, are aware of how the experience may be used. Intra-service diversity is as much an unknown as the content of easily understood occupations which are uniform across services. There has been a reluctance for any one agency, i.e. Department of Defense, Department of Labor, Department of Health, Education and Welfare, Veteran's Administration, or Office of Economic Opportunity, to assume the leadership in this area. Consequently, the efforts have been fragmented and not productive.

1. Interdepartmental activity under a strong leader is essential. Information on military occupations and training as well as on returning veterans must flow from the services to appropriate groups. For example, national industrial associations and labor unions should be made the direct recipients of this information. Demanders in need of skilled labor have an incentive in undertaking information clearing which is lacking in other institutions.

2. The services should prepare in a form readily understood by job counselors, trade associations and labor market intermediaries, information in such detail that along with the veteran's MOS or NEC counselors could recommend likely alternatives, i.e. jobs, training, etc.

3. A system of occupations linked to the training experience and not necessarily specific civilian hardware or industry is required to effectively evaluate the range of employment opportunities stemming from the military experience.

4. Information should be made available to servicemen as early as possible before discharge to allow them time to obtain relevant data on civilian options. The names of the to-be-discharged should be released to the operating arm of this inter-governmental committee. On a regular basis there would be a review of the stock of people which would help prospective employers contact employees and judge the success of the operation.[45]

The likely response by the military to such a program is that it would adversely affect reenlistment rates, and particularly in those occupations where the greatest investment has been made. While we recognize that this is a possible effect, ceteris paribus it may not lower reenlistment. Indications are that employers do not reward military experience and this information may discourage the servicemen going out to the apparently greener grass of the outside world. Regardless of the effect on reenlistment, the decision should be based on overall manpower policy that does not exclude military concerns but places them in the perspective of alternative goals and institutions.

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[45] Where this committee would be administratively housed is important only for the variance in incentives to see such a system work.

Occupational Structure. The existing structure of both the civilian employers, civil service, and the military discourage crossover. Trade union and professional associations are reinforcing in the impediment of crossover. Seniority rights for promotion and bumping, along with hiring practices, discourage transfer of the veteran's skills. Employers cannot effectively use the skills and veterans are unable to reap rewards making transfer a worthwhile decision. It would be inefficient to transfer a veteran to a low paying civilian job to use the capital. Consequently we recommend:

1. When hiring standards preclude hiring the semi-finished worker, a training effort conducted on-the-job should be undertaken to raise the skill level. The most reasonable way to use the needed skills is to aid employers with information to help them tailor their programs. Subsidization is not unreasonable if it is to compensate the employee during a brief training period and thus reduce the risk and other costs of hiring semi-finished workers.

2. Training equivalencies for the military experience should be established whenever required. If and when the military training is superior to the civilian it shall be noted and used as a basis for upgrading civilian training.

3. It may be reasonable to reduce intra-service variance in training by a vocational program after service to homogenize the skill levels of returning veterans.

4. Alteration in occupational structure along with training may be an effective device in recognizing and using the military skills. Cooperation of professional and labor organizations is essential for this to work effectively.

5. The military has alternative occupational structures and training programs. They have developed occupations for the lower skill levels and then trained for them. The experience of the military in occupational structure as well as vocational education should be examined to see how non-military training should be adjusted, such as the experience in the Job Corps. On the other hand, the military occupational and training system may be deemed inappropriate in part. Hence, it is not unwarranted to suggest altering some military decisions to help goodness of fit with civilian utilization.[46]

Using the "best" soldier in an occupation may be an optimal personnel decision for the military, given their constraints. Assignment of second or third best, with increased training and service life, may leave the military unaffected yet increase the flow to related civilian occupations.

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[46] This is suggested with the provision that the military system is not adversely affected. It may pay to alter time in service regulations or military procurement policy and planning budget to make this effective.

Wages. The pay in some occupations may be below the equilibrium level and this discourages transfer. The failure of many veterans to use their skills in needed fields, such as police, is partly due to problems which are amenable to solution with the preceeding recommendations. If the pay is low, then all of the above programs may be fruitless. On the other hand, the mere elevation of pay, given the imperfection in the market and the results of our survey, would not be a reasonable device to aid crossover.

Future Research

While we have reported on the subjective evaluation of veterans in their post-service employment, an objective evaluation has not been presented.

Available to the study, via the survey, is considerable data on the occupations of veterans. Applying the new Dictionary of Occupational Titles we identified our respondents for both post- and pre-service employment. For each of these occupations the respondents evaluated the extent of crossover and this indicated considerable overlap. For example, veterans with the same MOS and civilian DOT occupation evaluated relatedness across the continuum from no to high relation. Hence, there is little basis from that technique to objectively specify the rate of convergence.

The purposes for which the occupational systems were constructed points up our problem. The Census breakdown is very broad, reflecting primarily the level of skill; i.e. non-skilled, semi-skilled, professional, etc. It is too broad either to look closely at the use of skill or to suggest policy changes to alter career patterns. On another level it has little relation to the hiring standards or job titles used by firms. The categories, designed for aggregate analysis, lend little understanding to the micro-analytic problems of employing specific human capital.

The DOT classification has been designed for employment counseling. Its application by the Bureau of Employment Security to suggest where job applicants may go depends on the accounting of working time in specific tasks. The discrete occupation then symbolizes an assortment of tasks. Many occupations may share specific tasks and the structure of occupations can be altered to regroup along different task lines. Two jobs with specific activities but in different proportions may be in separate occupations. Part of the code designator refers to characteristics of the job and industry, while other attributes required for the job are in a separate part of the code. Further, general and educational levels are specified for occupations. It is here that the problem of establishing relatedness bogs down. Specific training, according to Mincer, refers to a job in a specific employee-employer relation. There is no way to indicate from the very elaborate scheme of categorization how much additional training is needed to move a person from one DOT occupation to another. The elaboration of the DOT occupations for each of the military occupation categories did not clarify the problem.

While the technique of obtaining occupations works, it is not useful for the purpose that we had planned. Thus, our failing leaves us unable to suggest what training would be necessary to qualify people for additional jobs.[47] Moreover, the hiring practices of firms indicate that the accumulation of this data was extraneous.

The proper development of policy would require both a reorganized occupational classification schema and a different set of hiring and job standards. Despite the efforts at reorganizing the DOT, we cannot use the system because it is theoretically difficult, being outside the framework of the developments in human capital.

A step to improve the utilization characteristics could be drawn from a set of occupational matrices. Each matrix would have a group of related occupations at two points in time. From the observed flow of people from occupation to occupation one would observe the *ex post* convergence of occupations. The actual occupational classifications to be used would require extensive theoretical research.

None of this research will throw light on the post-service experience of minority and disadvantaged groups.

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[47] Having wage rates for occupations would not improve our understanding for the purposes of manpower planning.

The choice of occupations also restricts the interpretations that can be given to this analysis. What this does suggest is that research designed to illuminate the experience of veterans and non-veterans be examined in detail. This can only be done by the government.

In exploring the non-vocational effect of the military some disconcerting negative impacts came to light. One of these, the failure of the vocational experience to be recognized in income terms indicates a negative valuation to the investment, compared to alternative income possibilities. A noticeable group of veterans were discovered in tabulations on veterans' status prepared by the Federal Bureau of Prisons. While this data is fragmentary it indicates a substantial number of incarcerated veterans. If these men did not have a record of offences prior to entry into the service,[48] was the service a contributory factor in their becoming offenders. If exposure to the military has this adverse affect, then military procurement policy may trigger criminal behavior as well as open up new technologies for the criminal.

Like most manpower studies, this has shown how little is known about the subject. At no time was a cost/benefit comparison study contemplated between the military and other institutions. In the light of the crossover data, none is now warranted unless accompanied by employer indoctrination programs. While our information did not move in the direction of training comparisons, it does suggest that the teaching techniques developed in the military should be examined for the guidance they may offer in civilian vocational and educational activity. This research would be a major undertaking because the planning, implementation, and evaluation may be done at different places. The perception of the training effort from the Washington perspective may be totally different from that carried on in the field.

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[48] This assumption is reasonable since the procurement policy of the military discourages offender accessions.

These directions for research emerge from an overview. When critical occupations come into question (medical, police, aircraft mechanic, etc.) a narrower gauge of research is suggested both for aiding the direct transfer and indicating training in these occupations.

APPENDIX A

JOB DESCRIPTIONS OF MOS'S AND NEC'S CONTAINED IN THE STUDY

Source: Army - extracted from Department of the Army Regulations 611-201, Manual of Enlisted Military Occupational Specialties.
Navy - extracted from Department of the Navy, Bureau of Naval Personnel, Manual of Qualifications for Advancement in Rating, NAVPERS 18068A.

Army Occupations

Military Police (1)

Military Policeman - MOS 951.

Duties: Patrols designated areas, controls pedestrian and vehicular traffic, quells disturbances, protects security sites, guards military prisoners and prisoners of war, and performs other police functions to enforce law and order and maintain military control and discipline. Performs foot or motorized patrol of assigned area. Investigates unusual occurrences and disruptive incidents for evidence of criminal activity or law violation. Verifies authenticity of passes and credentials of individuals traveling on common carriers, circulating in towns and cities, or entering or leaving restricted areas. Interrogates suspected law violators and cautions or apprehends personnel behaving contrary to military rules and regulations. Coordinates with civilian authorities in apprehension, detention, and disposition of military prisoners and law violators. Directs movement of pedestrian and vehicular traffic at road intersections by use of hand, light, and whistle signals. Provides local geographical information services. Clears roads of unessential traffic and escorts military traffic along route of march. Investigates and renders assistance in traffic accidents, furnishes first aid, arranges for evacuation of injured, and prepares necessary reports. Guards prisoners of war in camps, inclosures, prisoner of war cages, and during interrogation, evacuation, and transfer. Guards military prisoners in confinement facilities and on work details. Assembles, counts, and segregates prisoners. Performs routine inspections and searches to ascertain prisoner count and condition of compound facilities, locate contraband, note security violations, and prevent prisoner mistreatment. Assists in search for missing or escaped prisoners. Fingerprints, records, and files data pertaining to apprehended personnel. Prevents unauthorized entry, pilferage, and damage or loss of property from natural or other hazards at military installations, freight terminals, or ports. Takes appropriate action in such emergencies as riots, fires, floods, outbreaks, or unusual occurrences. Employs radiotelephone equipment in communicating with command post and military police patrols. Prepares reports of infractions of regulations. Testifies at hearings, investigations and courts-martial. Assists in executing established evacuation and tactical defense plans in case of emergencies. Controls movement of refugees and displaced persons and directs them to holding areas. Supervises military policemen in enforcement of military laws, rules, and regulations. Instructs, assigns, and rotates subordinate policemen in accordance with abilities and operating situations. Prepares, consolidates, and reviews reports of military police activities, and maintains records of these activities. Assists officers in command and staff sections in appraisal, collection, preparation, and distribution of material and data pertaining to intelligence, operations, and training. Serves as principal non-commissioned officer of military police company, battalion, or comparable or higher level unit. Supervises and inspects duties performed by subordinate noncommissioned officers of unit. Holds sergeant major's or first sergeant's call to disseminate orders and items of information to subordinate enlisted commanders. Advises commanding officer and staff on matters relative to troop welfare in terms of assignment, promotion, privileges, discipline, training, and supply. Indoctrinates new personnel of unit in military courtesy, customs of service, and local regulations. Schedules military training. Assists in inspection of unit personnel and assigned unit areas such as barracks and mess facilities. Makes notes of observed discrepancies and initiates appropriate corrective action.

Related Civilian Occupations:

DOT classification	Code
Armed Guard	2-61.30
Detective	2-65.01
Gateman	2-61.01
Guard, Institution	2-61.21
Policeman	2-66.23

Federal Civil Service classification	Code
Guard	GS 085
Guard (Detention)	GS 087
Police	GS 083

Confinement Supervisor - MOS 952

Duties: Supervises disciplinary guards engaged in enforcement of military orders and regulations governing custody of military prisoners at large garrison, regional stockade, United States Disciplinary Barracks, or rehabilitation center. Assigns guards to watch towers, cell blocks, and patrol stations. Tours area to ascertain that guards are relieved on schedule and that all posts are properly manned. Receives and discharges prisoners, verifying authority for confinement or release. Supervises prisoner searches and inspections to locate contraband. Forms prisoners for reveille count and conducts roll call. Ascertains destination of work details and assignment of proper guard. Investigates disturbances and escapes and takes necessary action to restore order and initiate search. Inspects cell blocks, towers, and physical plants to insure proper confinement of personnel and that property is in good repair. Supervises issue of weapons to duty guards. Inspects patrol paths and lighting facilities to assure maximum visibility. Notifies appropriate agencies in event of fire, escape, or cell block disturbances. Supervises maintenance of reports and records of custodial activities. Serves as principal non-commissioned officer of disciplinary guard company, military police stockade, rehabilitation center or disciplinary barracks. Provides for proper custody, control, and treatment of prisoners within close confinement cell blocks, prisoner barracks, hospital prisoner wards, prisoner mess halls, visiting rooms, and exercise yards. Controls entrance of personnel, materials, and vehicles to, and exit from, confinement facilities by checking credentials and examining materials and vehicles. Conducts necessary search of individuals, shakedown of vehicles and equipment, and insures that gates, locks, and similar equipment are secure and operable. Holds sergeant major's or first sergeant's call to disseminate orders and items of information to subordinate enlisted commanders. Advises commanding officer and staff on matters relative to troop welfare in terms of assignment, reassignment, promotion, privileges, discipline, training, and supply. Indoctrinates new personnel of organization in military courtesy, customs of service, and local regulations. Schedules military training. Assists in inspection of barracks, kitchen, other unit areas, and personnel. Makes notes of observed discrepancies and initiates appropriate corrective action.

Related Civilian Occupations:

DOT classification	Code
Guard Captain	2-61.71
Guard, Institution	2-61.21
Guard Sergeant	2-61.70
Policeman	2-66.23

Federal Civil Service classification	Code
Guard (Detention)	GS 087

Assistant Criminal Investigator - MOS 953

Duties: Investigates incidents and offenses, and inquiries into complaints and allegations involving Government property and individuals subject to the Uniform Code of Military Justice. Examines crime scenes for evidence such as fingerprints, bloodstains, weapons, footprints, and documents. Photographs and sketches crime scenes. Interviews witnesses, suspects, and victims and obtains statements. Collects, preserves, and submits evidence to crime laboratory for analysis and identification. Studies and analyzes evidence, laboratory findings, and statements to determine motives and persons responsible for crime, incident, or offense. Assists in raids and search of premises and effects apprehension of suspects and subjects. Prepares reports of investigations. Testifies at trials before courts-martial or other appropriate judiciary tribunals. Assists in conducting scientific examination and analysis of physical evidence, such as firearms identification, documents examination, chemical analysis, investigative photography, and fingerprint examination.

Related Civilian Occupations:

DOT classification	Code
Ballistic Expert	0-66.31
Detective	2-66.12
Detective	2-66.11
Fingerprint Classifier	0-66.33
Handwriting Expert	0-66.34
Investigator	1-18.35

Federal Civil Service classification	Code
Criminal Investigating	GS 1811

Data Processing (2)

EAM and ADPS Auxiliary Equipment Repairman - MOS 302

Duties: Performs organizational and higher level maintenance, including repair and modification, on electrical accounting machines and on auxiliary equipment of automatic data processing systems. Makes regular inspections of equipment to insure proper working condition, and adjusts or repairs improperly operating machines. Locates malfunctioning unit by inspection of key electrical and mechanical components, consultation and discussion of equipment behavior with operators, study of circuit diagrams, inspection of cards and tapes being processed, and check of control panel wiring. Test operates equipment to determine nature, location, and extent of trouble. Localizes malfunction, determines causes of breakdown, and decides extent of maintenance required. Disassembles unit of equipment to which trouble has been traced. Replaces items in electrical accounting equipment such as pins, gears, arms, shafts, and rollers. Adjusts items such as feed knives and throatblocks. Adjusts and repairs relays, solenoids, drive motors, magnetic clutches, automatic tensioning equipment, and other electromechanical components associated with ADPS auxiliary equipment. Cleans, oils, and lubricates equipment. Performs minor modifications in accordance with modification work orders. Participates in trouble shooting and accomplishment of major repairs and modifications. Prepares and keeps maintenance records.

Related Civilian Occupations:

DOT classification	Code
Statistical-Machine Serviceman.............	5-83.126
Tabulating-Equipment Mechanic..............	5-83.128

Federal Civil Service classification	Code
Office Appliance Repairing.................	WB 4806

ADPS Repairman - Mos 303

Duties: Inspects, tests, diagnoses, corrects failures, and performs preventive maintenance and minor repairs on electrical components of peripheral equipment and central electronic computer equipment, including console control panel, memory device, arithmetic, power supply, and auxiliary units. Participates in periodic preventive maintenance of computer components and associated units. Cleans equipment, replaces minor faulty parts, and makes adjustments to equipment elements. Periodically checks operation of computer by special diagnostic test programs. Interprets circuit diagrams and utilizes standard and special test equipment to locate and remedy equipment faults. Performs minor modifications in accordance with modification work orders. Participates in making major modifications and repairs under supervision. Maintains tools and test equipment. Prepares and keeps maintenance records.

Related Civilian Occupations:

DOT classification	Code
Electronics Technician	5-83.444

Federal Civil Service classification

none

Data Processing Equipment Operator - MOS 740

Duties: Operates elecrrical accounting machines and auxiliary electronic computer equipment and wires control panels. Operates electrical accounting equipment, such as sorters, interpreters, reproducers, and collators. Operates auxiliary electronic equipment, such as card readers, card punchers, printers, tape duplicators, and tape units on stored program computers. Tabulates data automatically to prepare rosters and lists containing personnel, supply, medical, fiscal, or other information. Performs elementary wiring of control panels for electrical accounting and auxiliary electronic computer equipment. Test-operates equipment to assure correctness of wiring. Analyzes and corrects, or refers to supervisor stoppages in electrical accounting or auxiliary electronic computer equipment.

Related Civilian Occupations:

DOT classification	Code
Sorting Machine Operator	1-25.63
Supervisor, Machine-Records Unit	1-25.67
Tabulating Machine Operator	1-25.64
Verifying Machine Operator	1-25.66

Federal Civil Service classification	Code
Sorting Machine Operation	GS 357
Tabulating Equipment Operation	GS 359
Tabulating Machine Operation	GS 358

Card and Tape Writer - MOS 741

Duties: Operates card punch, verifier, and magnetic or paper tape writer. Operates alphabetical card punch and verifier to prepare or change tabulating cards or to check completed work of other card punch operators. Operates magnetic or paper tape writer to put instructions and data in tape form. Verifies accuracy of prepared cards and tape. Examines previously coded source material or instruction sheet to determine information to be transcribed. Insures that material is sorted by type of card or sequenced by order on tape. Consults draft of data for special instructions as to spacing and format. Prepares card punch, inserts type of skip bar required, turns on switches, and makes trial card to determine if machine is functioning properly. Inserts cards in feeder. Punches coded information on card in proper column using both alphabetical and numerical sections of keyboard. Verifies completed cards. Reads punches on top card in stock to be verified and checks card against source documents used for original punch operation. Prepares tape or paper punch by placing spool of tape on spindle and threading. Inserts paper in roller for printed copy. Installs tabular stops and sets spacer bar. Records data in binary code on magnetic or paper tape by striking keys on keyboard. Compares type copy with draft and corrects errors. Verifies tape by retyping draft and inserting correct information if writer stops. Rewinds, labels, and submits tape to library.

Related Civilian Occupations:

DOT classifications	Code
Clerk-Typist	1-37.34
Key-Punch Operator	1-25.62

Federal Civil Service classification	Code
Sorting Machine Operation	GS 357
Tabulating Machine Operation	GS 358
Typist	GS 320

Personnel Accounting Specialist - MOS 742

Duties: Analyzes, audits, and codes incoming source material on personnel and equipment prior to preparation of tabulating cards. Receives morning and equipment status reports, and records receipt of information. Obtains master tabulating card or control card. Ascertains organizations which are delinquent in submission of reports, and initiates action to secure missing information. Codes and processes morning reports and related source documents. Indicates columnar limits of fields in which information is to be punched for equipment status information. Notes and corrects such errors or omissions as missing dates, grades, MOS, and incorrect primary line item number. Verifies machine processed information by comparing punched information with source data. Compares completed listings and reports prepared from tabulating cards with information contained in card file and makes necessary corrections. In supervisory positions, plans, directs, and coordinates work of subordinates, develops and implements training programs, and schedules and makes work assignments. Supervises operations of machine records unit by determining proper action section and making contacts with various staffs and units. Reviews correspondence from organizations and staffs of commands serviced.

Related Civilian Occupations:

DOT classification	Code
Coding Clerk	1-36.05
Statistical Clerk	1-36.01

Federal Civil Service classification	Code
Statistical Clerical and Administrative	GS 1531
Statistical Coding	GS 1532
Tabulating Equipment Operation	GS 359

Machine Accounting Specialist - MOS 743

Duties: Plans, organizes, and supervises operation of machine accounting unit. Supervises operation of, and operates, electrical accounting machines and wires control panels. Advises and assists subordinate machine operators in handling unusual and difficult operations. Analyzes and corrects machine stoppages. Performs complex control panel wiring, and test-operates machine to assure correctness of wiring.

Plans and organizes work schedules, assigns duties, and instructs personnel in proper work techniques and procedures.

Related Civilian Occupations:

DOT classification	Code
Sorting Machine Operator	1-25.63
Supervisor, Machine-Records Unit	1-25.67
Tabulating Machine Operator	1-25.64
Verifier Operator	1-25.66

Federal Civil Service classification	Code
Sorting Machine Operation	GS 357
Tabulating Equipment Operation	GS 359
Tabulating Machine Operation	GS 358

APDS Console Operator - MOS 744

Duties: Operates console on stored program electronic computer. Consults schedule of programs to be processed and obtains appropriate input data cards, program cards or magnetic tapes, console instruction sheets, and program of computer instructions. Mounts program and work tapes, loads input data, and connects auxiliary equipment. Operates control switches on computer console to load program into memory, and process input data. Analyzes display panel of console and error print-out on autotypewriter to locate cause of computer stoppages. Operates console to correct elementary errors requiring address modification or input data revision. Confers with programmer in event of complex errors requiring changes of instruction, sequence, replacement of instruction, or revision of logic. Reports equipment malfunction and input data content errors to operations supervisor. Rewinds and removes tapes and cards at completion of processing. Maintains log of computer processing time. Prepares schedule of programs to be processed according to priority and processing time.

Related Civilian Occupations:

DOT classification	Code
Console Operator	1-25.17
Sorting Machine Operator	1-25.63
Supervisor, Machine-Records Unit	1-25.67
Tabulating Machine Operator	1-25.64
Verifying Machine Operator	1-25.66

Federal Civil Service classification	Code
Digital Computer Equipment Operation	GS 332
Sorting Machine Operation	GS 357
Tabulating Equipment Operation	GS 359
Tabulating Machine Operation	GS 358

ADPS Programming Specialist - MOS 745

Duties: Performs elementary mathematical, analytical, and subject matter investigations in areas such as personnel, supply, fiscal, financial and medical programs required for developing procedures to solve programing problems. Develops methods and computational procedures necessary for reducing mathematical or data processing application into detailed instructions, routines, and codes. Prepares flow charts, block diagrams, and flow diagrams to outline necessary computer operations in processing of data. Develops programing instructions from flow charts and instructions for use by operators in processing each problem. Edits instructional routines and reviews completed program for logic and efficiency. Confers with ADPS Console Operator during debugging of instructional routines on computer for purpose of determining necessary corrections to routine. Analyzes results of computer performance tests to evaluate such factors as accuracy and achievement of desired logic and to determine effectiveness of instructional programs. Reviews existing programs for applicability of new techniques. Analyzes logic flow charts and block diagrams and translates operations into program of coded computer instructions. Optimizes program by placing coded instructions and data in specified locations in memory unit or by using automatic coding techniques. Adapts utility routines to program to reduce number of computer instructions and data and to omit information. Constructs input data test to verify validity of instructions in program. Transcribes program of instructions and test input data to punch card or magnetic tape for insertion into computer. Loads instructions and data into memory unit and corrects simple instruction errors by manually operating computer console. In program debugging, changes memory address of instruction, sequence of instruction, or choice of certain instructions, as required. Prepares permanent card deck or tape of completed and tested program. Implements program and assists console operator in ascertaining possible causes of machine stoppage. Writes detailed instruction sheet for reference by console operator. Reviews and makes minor modifications to existing programs requiring additions, substititions, or deletions by changing coded instructions.

Related Civilian Occupations:

DOT classification	Code
Programer	0-69.981

Federal Civil Service classification	Code
Digital computer programing	GS 331

Operative-Construction (3)

Construction Helper - MOS 510

Duties: Assists personnel in performing construction and associated duties usually in support of activities of communications zone. Paints, handles materials, and otherwise assists carpenters, masons, and structures workers in fabrication and erection of wood, steel, concrete and masonry bridges, buildings, and other military type structures. Assists in preparation of camouflage materials and installations. Patrols pipeline and operates pumping station. Drives and performs operator maintenance on light wheel vehicles.

Related Civilian Occupations:

DOT classification	Code
Bricklayer Helper	9-32.
Laborer, Carpentry	9-32.
Painter	7-27.
Rigger Helper	9-32.
Structural Steel Worker Helper	9-32.

Federal Civil Service classification	Code
Carpentry	WB 4607
Fuel Distribution Systems Operating	WB 5413
Masonry	WB 3603
Property Handling	WB 3905
Pipefitting	WB 4204
Rigging	WB 5722
Structural Iron Working	WB 3807

Carpenter - MOS 511

Duties: Performs general carpentry duties in fabrication, erection, and maintenance of wooden structures and a variety of wooden articles. Examines blueprints, sketches, drawings, and plans for new construction. Inspects repair jobs, estimates materials needed, and requisitions tools and materials. Builds concrete forms or scaffolding for erection or repair of cement, brick, or cinder block foundation walls. Erects building framework. Applies siding or exterior sheathing and subflooring. Installs door and window frames. Hangs doors, installs window sashes, and builds partitions and stairs. Installs interior finish, such as floors, stairs, wainscoting, cabinets and hardware. Replaces worn flooring, stair treads, rope and window weights, and rotted sills. Rehangs defective doors and windows. Assists in erection of rough timber structures, such as trestles, bridges, piers, and wharves. Maintains tools and equipment. Performs other carpentry tasks as instructed.

Related Civilian Occupations:

DOT classification	Code
Carpenter	5-25.

Federal Civil Service classification	Code
Carpenter	WB 4607

Mason - MOS 513

Duties: Builds and repairs walls, drains, bridge supports, roadways, chimneys, and other masonry structures. Examines blueprints or other building plans to determine detailed procedures and type and amount of materials needed. Cuts, trims, and faces stones to proper size and shape. Prepares bed of mortar or cement on surface where structure is to be build. Positions brick, hollow tile, building-blocks, or stones exactly and removes excess mortar with trowel. Finishes joints with point of trowel. Uses guide line to aline blocks and stone laying. Assists in placement of forms for concrete walls, floors, walks, roads, and runways. Vibrates, tamps, or puddles concrete and finishes with float, straightedge, trowel, or other device. Assists other specialists in construction work.

Related Civilian Occupations:

DOT classification	Code
Bricklayer	5-24.
Chimney Builder	5-24.
Cement Finisher	5-26.
Form Setter, Wood Forms	5-25.
Stonemason	5-24.

Federal Civil Service classification	Code
Bricklaying	WB 3607
Cement Finishing	WB 3602
Masonry	WB 3603

Utilities Worker - MOS 520

Duties: Assists personnel in providing and maintaining utilities portions of new and rehabilitation construction in communications zone. Assists specialists in installing, maintaining and repairing heating, ventilating, refrigerating and air-conditioning systems and water supply and sewage disposal lines; in purification and storage of water and in production of industrial type gases. Fabricates or repairs sheet metal articles such as stove pipes, air ducts, roof flashing and gutters. Cleans and repairs clogged or leaking plumbing. Assists in installation or repair of wiring and electrical devices such as switches, sockets, and plugs. Replaces fuses and bulbs. Makes repairs to masonry and concrete of latrines, kitchens, culverts, and similar facilities. Makes rough wooden articles such as tables and shelves. Paints buildings, signs, and equipment. Cleans and maintains tools for specialists. Operates and performs operator maintenance on light wheel vehicles.

Related Civilian Occupations:

DOT classification	Code
Plumber Helper	7-32.812
Refrigeration-Mechanic Helper	9-83.01
Sheet Metal Worker Apprentice	7-97.040
Water Filterer Helper	9-54.60

Federal Civil Service classification	Code
Chemical Plant Operating	WB 5427
Plumbing	WB 4206
Sheet Metal Working	WB 3806
Water Plant Operating	WB 5409

Heating and Ventilating Specialist - MOS 521

Duties: Fabricates and repairs sheet metal items of copper, tin, terneplate and metal alloy stock by punching, bending, soldering, riveting, welding, nailing, grooving and bolting. Installs and repairs heating units, nonrefrigerated air conditioning and ventilating units, and associated control devices. Examines blueprints and other specifications and plans work procedures. Positions gas, oil burning, and hand fired and stoker operated coal units. Connects heating outlets of units to piping or ducts of hot air, steam, or hot water heat distribution systems. Services and repairs these systems. Assists and coordinates work with other utilities specialists.

Related Civilian Occupations:

DOT classification	Code
Sheet Metal Worker..........................	4-80.010
Ventilation Man..............................	7-72.420

Federal Civil Service classification	Code
Heating Equipment Repairing.................	WB 5309
Sheet Metal Working..........................	WB 3806

Plumber - MOS 522

Duties: Installs and repairs pipe systems and fixtures for water, hot air, gas, steam, petroleum, compressed air, and waste disposal systems. Studies work specifications to determine appropriate pipe and type of fixtures required. Measures, cuts, threads or bends metal, concrete, wooden, or tile pipe. Connects pipe sections using appropriate fittings and by welding or packing with oakum and lead wool or hot lead. Installs water-closets, showers, sinks, and similar fixtures. Tests systems by filling with proper liquid or gas under operating pressure to detect leaks, and tightens loose connections as needed. Clears clogged pipes and thaws frozen systems. Insulates pipe and equipment using prefabricated fixture covering, asbestos cement, asbestos cloth and tape, and asbestos impregnated muslin. Affixes metal straps to hold covering in place and suspends overhead piping, using metal hangers.

Related Civilian Occupations:

DOT classification	Code
Pipefitter	5-30.010
Plumber	5-30.210

Federal Civil Service classification	Code
Pipefitting	WB 4204
Plumbing	WB 4206
Steamfitting	WB 4207

Structures Specialist - MOS 512

Duties: Lifts and moves heavy objects, services cargo handling gear, positions and joins heavy beams, fabricated pieces or trusses, and other structural assemblies. Selects and assembles materials used in constructing rigging such as windlass, A-frame, shears, holdfast, stiff-leg derrick, cribbing and blocking. Repairs and replaces such rigging material as thimbles, sockets, hooks, boat mooring lines, and such cargo handling gear as rope and wire slings and box hooks. Examines blueprints or plans and prepares steel, wood, or other members by cutting to size, drilling or burning holes, and caulking seams and joints. Controls raising and placing of members by hand signals. Alines members by inserting drift pins; joins members by using bolts, or rivets or by welding. Performs preventive maintenance on tools and equipment.

Related Civilian Occupations:

DOT classification	Code
Bolter-up	6-84.
Joist Setter	6-84.
Rigger	5-49.205
Riveter	6-84.
Ship Rigger	5-05.570
Structural Steel Worker	4-84.
Welder, Acetylene	4-85.

Federal Civil Service classification	Code
Rigging	WB 5722
Structural Iron Working	WB 3807

Sawyer - MOS 545

Duties: Participates in and supervises logging and sawmill operations in felling timber, transporting logs to sawmill, processing logs into lumber, and installing and maintaining sawmill equipment. Selects trees to be felled and determines milling operations to be performed in producing required dimensions of lumber. Installs and operates saw and attendant equipment. Sharpens saw blade, services engine, lubricates equipment, and directs other specialists such as welders, electricians, and mechanics in correction of malfunctions. Serves as principal noncommissioned officer of forestry company or comparable organization and supervises and inspects duties performed by subordinate noncommissioned officers. Disseminates orders and items of information to subordinate enlisted commanders. Advises commanding officer on matters relative to troop welfare in terms of assignment, reassignment, promotion, privileges, discipline, training, and supply. Indoctrinates new personnel of organization in military courtesy, customs of the service, and local regulations. Forms unit for drill, fatigue, guard, and other military formations. Schedules military training. Assists in inspection of unit area, makes notes of observed discrepancies, and initiates appropriate corrective action.

Related Civilian Occupations:

DOT classification	Code
Bucker, Head	5-91.401
Circular Head Saw Operator	4-31.120
Faller, Head	6-30.140
Log Grader	4-29.020
Log Scaler	6-29.010

Federal Civil Service classification	Code
Forestry Aid	GS 462
Lumber Handling	WB 6902
Sawmill Operating	WB 4608

Operative-Repair (4)

Automotive Maintenance Helper - MOS 630

Duties: Performs organizational maintenance and assists in repair of automotive vehicles and associated equipment. Detects malfunctions by performance of routine operational road tests. Inspects automotive vehicle accessories and components to determine nature and extent of malfunction and maintenance required. Services and adjusts such items as brakes, clutch, and steering mechanism. Replaces assemblies and parts, such as spark plugs, distributor points and coils, wiring, fuel, and oil pumps, and brake linings and shoes. Tightens loose connections including body bolts and clamps. Cleans and lubricates vehicle and components. Tests storage batteries for specific voltages and charges batteries testing below specified voltage. Prepares vehicles for operation under abnormal conditions by sealing, waterproofing, and servicing with special fuel, coolant, and lubricants. Performs recovery of organizational vehicles.

Related Civilian Occupations:

DOT classification	Code
Automobile Mechanic	5-81.010
Automobile Mechanic, Motor	5-81.610
Automobile-Repair Serviceman	5-81.910
Truck Mechanic	5-81.030

Federal Civil Service classification	Code
Automotive Equipment Repairing	WB 5823
Combat Vehicle Inspecting	WB 5808
Combat Vehicle Repairing	WB 5807
Mobile Equipment Servicing	WB 5806

Wheel Vehicle Mechanic - MOS 631

Duties: Performs organizational maintenance on wheel vehicles, amphibious wheel vehicles, and associated accessories and equipment. Makes road tests to determine malfunctioning components, parts, and accessories. Determines causes of malfunctions by performing series of tests using organizational test equipment. Inspects vehicle components and accessories to determine nature and extent of malfunction and maintenance required. Replaces defective parts and assemblies as authorized within scope of organizational maintenance. Makes minor adjustments and lubricates vehicle in accordance with lubrication orders. Tightens body and chassis clamps, bolts, and connections. Recovers organizational vehicles. Performs administrative and operational duties in organizational motor pool and in motor maintenance section.

Related Civilian Occupations:

DOT classification	Code
Automobile Mechanic	5-81.010
Automobile Mechanic, Motor	5-81.610
Automobile-Repair Serviceman	5-81.910
Tractor Mechanic	5-81.040
Truck Mechanic	5-81.030

Federal Civil Service classification	Code
Automotive or Engineer Equipment Repairing, Fuel and Electrical Systems	WB 5818
Automotive or Equipment Repairing, Wheels and Brakes	WB 5825
Automotive Equipment Repairing	WB 5823
Combat Vehicle Inspecting	WB 5808
Combat Vehicle Repairing	WB 5807

Fuel and Electrical Systems Repairman - MOS 634

Duties: Inspects, tests, and diagnoses fuel and electrical systems to determine location, cause, and nature of malfunctions. Diagnoses carburetor and fuel pump deficiencies by performing vacuum, compression, and acceleration tests using such tools as vacuum and cylinder compression gages. Tests electrical system assemblies and units, such as battery, generator, distributor, starting motor, wiring harness, and ignition system by using hand-tools and testing devices, such as tachometer, growler, voltmeter, ohmmeter, and Weidenhoff test bench. Adjusts and repairs fuel and electrical system units. Disassembles fuel induction units into component parts, such as jets, valves, springs, and gaskets, and examines parts visually and manually for wear, corrosion, and correct spring tension. Cleans parts using cleaning solvent. Measures parts for correct tolerances using precision measuring instruments. Repairs electrical system units, such as generator, distributor, and starting motor. Cleans generator commutator, solders commutator wiring connections, and replaces defective armatures, brushes, bearings, and bushings. Locates shorted or open electrical circuits using a voltmeter. Insulates bare wiring and replaces broken wiring. Replaces defective lamps, switches, circuit breakers, and fuses. Reassembles fuel and electrical system units and makes final inspections and adjustments.

Related Civilian Occupations:

DOT classification	Code
Automobile Generator Repairman	5-81.410
Automobile Tester	5-81.920

Federal Civil Service classification	Code
Automotive Equipment Repairing, Fuel and Electrical Systems	WB 5818
Combat Vehicle Repairing, Fuel and Electrical Systems	WB 5809

Automotive Repairman - MOS 635

Duties: Inspects, repairs, adjusts, replaces parts, and performs rebuild operations on automotive equipment. Examines vehicles for malfunction of engine, power train, chassis components, and accessories by visual, manual and auditory inspection, and by use of various automotive testing devices determines required repair or rebuild operations. Diagnoses and isolates cause of malfunction and completely or partially disassembles units to repair or replace defective parts. Alines and fits replacement parts to proper tolerances and reassembles unit. Adjusts components, such as carburetor, governor, and timer. Performs final instrument and performance tests of rebuilt units. Performs final shop and road tests on vehicles to insure adequacy and completeness of repairs. Operates variety of shop machines, such as grinding, boring, and shaping machines to perform grinding and shaping operations, such as grinding pistons and boring cylinders. Prepares forms, records, and reports partaining to automotive shop operations.

Related Civilian Occupations:

DOT classification	Code
Automobile Mechanic, Motor	5-81.610
Automobile Repair Serviceman	5-81.910
Automobile Tester	5-81.920
Automotive Mechanic	5-81.010
Tank Mechanic	5-05.810
Tractor Mechanic	5-51.040
Truck Mechanic	5-81.030

Federal Civil Service classification	Code
Automotive Equipment Repairing	WB 5823
Automotive Equipment Repairing, Engine Rebuilding	WB 5822
Automotive Equipment Repairing, Frame and Wheel Aligning	WB 5821
Automotive Equipment Repairing, Wheels and Brakes	WB 5825
Combat Vehicle Repairing	WB 5807
Combat Vehicle Inspecting	WB 5808

Fixed Station Receiver Repairman - MOS 271

Duties: Installs and performs field and depot maintenance of fixed station radio receiving equipment. Positions, secures, and interconnects equipment according to plans, specifications, or instructions. Tests equipment to localize and diagnose causes of malfunctions. Removes faulty or suspected components and examines for presence of foreign matter or other indications of damage. Checks actions of such items as relays, switches, and coils and makes necessary adjustments. Traces and tests circuit elements. Inspects, dismantles, and repairs circuit wiring and replaces defective major components and individual parts. Substitutes component parts and fabricates simple parts not requiring precision machine tooling. Cleans, tightens, and adjusts contacts, mountings, switches, relays, and meters. Test operates repaired equipment to assure proper operation. Prepares, reviews, and consolidates technical and administrative reports pertaining to fixed station operations. Supervises installation, operation, and maintenance of fixed station receiver equipment. Assigns equipment attendants and maintenance personnel and coordinates receiver station operations. Ascertains that fixed station radio receiver equipment is attended and kept in adjustment to operate at prescribed frequencies. Supervises periodic and emergency repairs and maintenance of equipment. Assists and instructs subordinates on complex maintenance problems.

Related Civilian Occupations:

DOT classification	Code
Radio Mechanic..............................	5-83.447
Radio Repairman.............................	5-83.411

Federal Civil Service classification	Code
Radio Equipment Inspecting.................	WB 2609
Radio Installing and Repair................	WB 2608

Fixed Station Transmitter Repairman - MOS 272

Duties: Installs and performs field and depot maintenance of fixed station radio transmitting equipment. Positions, secures, and interconnects equipment according to plans, specifications, or instructions. Tests equipment to localize and diagnose causes of malfunction. Removes faulty or suspected components and examines for presence of foreign matter or other indications of damage. Checks action of such items as relays, switches, and coils and makes necessary adjustments. Traces and tests circuit components of transmitting equipment. Inspects, dismantles and repairs circuit wiring and replaces defective components and individual parts. Substitutes component parts and fabricates simple parts not requiring precision machine tooling. Cleans, tightens, and adjusts contacts, mountings, switches, relays, and meters. Test operates repaired transmitter station equipment to assure proper operation. Prepares, reviews, and consolidates technical and administrative reports pertaining to fixed transmitting station operations. Supervises installation and maintenance, and operation of fixed station radio transmitting equipment. Assigns attendants and maintenance personnel to duties and ascertains that station transmitting equipment is kept in adjustment to operate at prescribed frequencies. Supervises periodic and emergency repairs and maintenance of equipment. Assists and instructs subordinates on complex operating and maintenance problems.

Related Civilian Occupations:

DOT classification	Code
Radio Mechanic..............................	5-83.447
Radio Repairman.............................	5-83.411

Federal Civil Service classification	Code
Radio Equipment Inspecting	WB 2609
Radio Installing and Repairing	WB 2608

Radar Repairman - MOS 282

Duties: Inspects, tests, and performs field and depot maintenance of radar equipment, such as surveillance, countermortar and counterartillery, ground fire control and search radar, IFF and ground control approach, height, azimuth, and distance finding air defense radar, servo and data transmission systems, and associated equipment including computers. Test operates equipment and observes meters, oscilloscopes, and test devices for indications of malfunction. Refers to circuit diagrams and makes detailed tests through stages of equipment, utilizing voltmeters, ohmmeters, distortion measuring sets, and oscilloscopes. Determines causes of breakdown and extent of maintenance required. Replaces faulty components, fabricates simple parts, adjusts relays, dials, and controls for proper operation. Cleans components of dust, rust, or fungus. Test operates, alines, and calibrates repaired equipment observing performance in comparison with test standards. Keeps tools and test equipment in operating condition. Supervises repair and depot maintenance of radar and associated equipment. Inspects and checks repairs performed by radar repairmen for adequacy and suitability. Assists in diagnosis of complex malfunctions. Instructs in and demonstrates correct repair procedures. Requisitions supplies and reviews, consolidates, and prepares administrative and technical reports pertaining to radar equipment repair activities.

Related Civilian Occupations:

DOT classification	Code
Electrician, Radio	5-83.445
Electronics Technician	5-83.444
Radar Equipment Foreman	5-92.621
Radar Repairman	5-83.411

Federal Civil Service classification	Code
Electronic Test Equipment Operating	WB 2607
Radar Equipment Inspecting	WB 2606
Radar Equipment Installing and Repairing	WB 2604

Television Equipment Repairman - MOS 285

Duties: Installs, operates, and performs field and depot maintenance of television equipment, such as cameras, camera control, switching, monitoring, transmitting, and receiving equipment. Performs operating adjustments to television equipment at operating sites. Maintains picture and sound quality during television presentations by adjusting controls to assure proper performance and operation of equipment. Coordinates with personnel controlling other portions of equipment on dial settings, meter readings, and positioning of switches and controls to clear up maladjustments of equipment. Positions, adjusts, and operates recording equipment to make film and sound recordings for reuse, subsequent release, or informational purposes. Tests equipment, inspects parts, checks mechanical and electrical action of components, and observes meter and other indicator readings to localize malfunctions. Traces circuits and checks circuit continuity. Localizes malfunction, determines cause of breakdown, and extent of repair required. Cleans, tightens, and adjusts operating components. Dismantles and repairs circuit wiring and replaces defective major components and individual parts. Substitutes component parts and fabricates simple parts not requiring precision machine tooling. Test operates repaired equipment to assure proper operation. Makes entries on equipment and station logs indicating operating difficulties, duration and cause of interruption, as well as steps taken to overcome difficulties. Supervises installation, operation, and maintenance of television equipment. Observes, selects, or recommends installation sites. Observes picture, sound, and operating deficiencies, and directs taking of corrective action. Coordinates clearing of difficulties and interferences existing between components and installation of operating system. Coordinates activities of specialists performing repair and replacement of faulty components. Advises and instructs subordinate personnel in maintenance and operating problems. Requisitions supplies and reviews, consolidates, and prepares technical and administrative reports pertaining to television equipment, technical operating, and maintenance activities.

Related Civilian Occupations:

DOT classification	Code
Television Service and Repairman	5-83.416

Federal Civil Service classification	Code
Motion Picture Sound Transmission Installing and Repairing	WB 2616
Radio Installing and Repairing	WB 2608
Radio Installation and Repair Inspecting	WB 2609

Telephone Trades (5)

Telephone Installer-Repairman - MOS 323

Duties: Installs and performs field maintenance on telephone equipment. Determines location for telephone installation at subscriber's location. Plans exterior, entry, and interior wiring. Climbs poles and tests with central office to determine serviceability of wire pair designated for use. Runs wire from pole to building. Places electrical protective devices in circuit. Drills holes to provide passage for wires. Protects wires passing through building with appropriate insulators. Runs interior wiring and secures with appropriate fasteners. Installs connector block near telephone and makes necessary connections to complete circuit. Tests completed installation. Makes necessary adjustments to dial and signal bells. Inspects and maintains telephone facilities at user's location. Makes repairs to line and instrument within scope of tools and material available. Assists central office specialists in central office activities. Installs and maintains field telephone equipment and assists in installation of switchboards. Tests and maintains local circuits. Spot checks work of subordinate installers to maintain quality of service. Instructs in all phases of installation, testing, and inspection of telephones.

Related Civilian Occupations:

DOT classification	Code
Station Installer II	5-53.030

Federal Civil Service classification	Code
Telephone Installing and Repairing	WB 2507

Manual Central Office Repairman - MOS 327

Duties: Installs and performs field and depot maintenance on manual central office telephone exchange equipment. Inspects, positions, alines, and secures equipment. Wires mainframe, switchboard, relay racks, wire chief's test cabinet, and related units. Replaces broken wires, tightens loose connections, and insulates to provide secure electrical connections between parts. Adjusts openings between contacting parts. Tests and changes spring tensions. Conducts operating and electrical tests and compares results with specified standards for type of equipment to ascertain extent and scope of maintenance required. Determines general causes of malfunction or nonfunction and dismantles components for more complete examination. Straightens bent frames, reconditions and rebuilds components, and measures and tests parts, rejecting those beyond economical repair. Replaces parts, rewires equipment, and interconnects components. Makes necessary corrections and adjustments to bring repaired equipment up to required level of performance. Treats equipment to prevent damage by moisture and fungus. Performs organizational maintenance on tools and test equipment. Participates in line tests and other central office tests to determine working order, to make computations, and to determine kind and location of wire and cable faults.

Related Civilian Occupations:

DOT classification	Code
Central Office Repairman....................	5-53.235

Federal Civil Service classification	Code
Central Office Telephone Equipment Installing and Repairing..................	WB 2502

Dial Central Office Repairman - MOS 328

Duties: Installs and performs field and depot maintenance on dial central office telephone exchange equipment. Inspects, positions, alines, and secures equipment. Wires main frame, switchboard, relay racks, wire chief's test cabinet, and related units. Makes wire connections between outside lines and inside plant. Adjusts residual gaps between parts. Margins relays to current values by adjusting spring tensions. Conducts peg counts and adjusts all types of dial system switches. Assists in conducting various tests to locate malfunctions in dial central office equipment and collaborates with outside plant personnel in clearing line troubles. Repairs or replaces small parts such as rotary switches, connectors, line finders, and relays. Adjusts and positions pile-ups to provide make-and-break contacts in proper sequence and timing. Conducts operating and electrical tests and compares results with specified standards for type of equipment under repair to ascertain extent and scope of maintenance required. Straightens bent frames, reconditions and rebuilds components, and measures and tests parts, rejecting those beyond economical repair. Replaces parts, rewires equipment, and interconnects components. Test-operates repaired equipment to assure proper functioning. Makes additional corrections and adjustments necessary to bring equipment up to required level of performance. Treats equipment to prevent damage by moisture and fungus. Performs organizational maintenance on tools and test equipment. Supervises and coordinates activities of personnel engaged in installation, operation, and field and depot maintenance of central office telephone exchange equipment. Allocates and controls circuits to teletypewriter, telephone, facsimile, and radio operations. Assists signal staff officers in continuous appraisal of telephone operations and collects, prepares, and distributes material and data pertaining to such operations. Makes recommendations and renders opinions concerning installation, plans, equipment specifications, traffic load, numbers and kinds of circuits involved, maintenance problems, and personnel required to operate and maintain activity. Prepares work schedules and operating instructions. Specifies duty assignments of operating and maintenance personnel. Directs keeping of necessary records. Corrects faulty work processes and instructs in, and demonstrates, correct procedures and techniques. Requisitions supplies and reviews, consolidates and prepares technical and administrative reports.

Teamster Trades (6)

Water Supply Specialist - MOS 526

Duties: Establishes and operates water supply points to provide pure potable water in designated areas. Reconnoiters, recommends, and clears sites for water supply points. Readies water purification and distillation equipment for operation. Selects treatment processes and equipment to conform to local conditions. Selects and determines appropriate chemicals necessary for treatment of water. Tests water for chemical content, clarity, odors, and taste. Issues water to using units. Performs maintenance on water purification and distillation units. Operates and performs preventive maintenance on wheeled vehicles. Supervises personnel engaged in setting up, operating, and maintaining water purification and distillation units. Prepares water reconnaissance reports. Directs and supervises issuing of water. Computes amounts of water used by units and probable amounts for future needs.

Prepares and consolidates reports for submission to higher authority. Requisitions materials and supplies. Serves as principal noncommissioned officer of water supply company or comparable organization and supervises and inspects duties performed by subordinate noncommissioned officers. Disseminates orders and items of information to subordinate enlisted commanders. Advises commanding officer on matters relative to troop welfare in terms of assignment, reassignment, promotion, privileges, discipline, training, and supply. Indoctrinates new personnel of organization in military courtesy, customs of the service, and local regulations. Forms unit for drill, fatigue, guard and other military formations. Schedules military training. Assists in inspection of unit area, makes notes of observed discrepancies, and initiates appropriate corrective action.

Related Civilian Occupations:

DOT classification	Code
Foreman....................................	5-95.340
Water Service Supervisor..................	7-54.621

Federal Civil Service classification	Code
Water Plant Operating.....................	WB 5409

Supply Handler - MOS 550

Duties: Receives, stores, transfers, and issues all types of supplies and material, except ammunition components and explosives. Loads and unloads supplies and material into and from ships, trucks, and freight cars, and places supplies in assigned storage locations. Repairs pallets, lays dunnage, and constructs blocking and bracing to meet requirements for shipping supplies and other material. Assists in inspection of bins and other storage areas to insure that supplies are correctly warehoused and maintained in proper condition in prescribed quantities and locations. Selects and assembles material to fill requisitions, and checks quantities, stock number, and nomenclature against shipping documents. Operates fork lifts, dock cranes, and spraying equipment. Applies protecting and preserving materials to supplies. Cleans, waterproofs, and prepares articles for shipment. Cuts stencils and paints handling instructions on containers. Assists in inspecting, reclaiming, cleaning, and filling petroleum containers. Assists in general salvage activities.

Related Civilian Occupations:

DOT classification	Code
Laborer, Stores	9-88.40
Longshoreman	9-47.10
Stock Clerk	1-38.01

Federal Civil Service classification	Code
Fork Lift Operating	WB 5704
Materials Segregating and Classifying	WB 6912
Salvage Labor	WB 6911
Warehousing, General	WB 6907

General Warehouseman - MOS 551

Duties: Supervises warehousing operations involved in receipt, storage, issue, and shipment of all classes of supplies. Assigns stock items within storage layouts, and relocates supplies as required. Requests, assigns, and controls use of warehouse equipment, laborers, checkers, and equipment operators to assure economic use of personnel and equipment. Supervises and performs duties involving packaging, crating, stenciling, weighing, and banding of stored stock items. Reviews and verifies shipping documents completed by subordinate personnel. Directs proper vermin control measures. Surveys indoor and outdoor storage locations for violations of fire and safety regulations, and to insure compliance with storage directives. Inspects all incoming and outgoing supplies for proper packaging, quantity, weight, and condition. Prepares reports on warehouse operations, use of equipment, location changes, and warehouse refusals. Instructs warehouse personnel in unloading, segregating, dunnaging, palletizing, and selection of stock and storage area load limitations.

Related Civilian Occupations:

DOT classification	Code
Box Maker, Wood III..........................	6-39.114
Electric-Truck Operator......................	7-88.410
Gasoline-Truck Operator......................	7-88.412
Stock Clerk..................................	1-38.01

Federal Civil Service classification	Code
Crating......................................	WB 4621
Fork Lift Operating..........................	WB 5704

Materials Segregating and Classifying.......WB 6912
Warehouse Tractor Operating.................WB 5709
Warehousing, General........................WB 6907

Petroleum Storage Specialist - MOS 552

Duties: Supervises and participates in receipt, storage, distribution and issue of bulk and packaged petroleum products. Supervises and operates petroleum systems, including off-vessel discharging and loading facilities, tank farms, pipelines, and dispensing equipment. Supervises and performs operator's maintenance on equipment and facilities used in petroleum distribution activities. Operates equipment to effect transfer or movement of bulk petroleum products through pipelines to proper storage locations and depots or tank farms. Issues and ships bulk or packaged petroleum products in accordance with approved schedules and requisitions. Supervises and performs duties involving inspection, reclamation, cleaning, and filling of petroleum containers. Makes visual inspection of outgoing petroleum products to insure proper quantities, packaging, and markings, and to detect product contamination or deterioration. Inspects bulk and packaged storage and distribution facilities and equipment, and recommends corrective action for deficiencies noted. Inspects, inventories, classifies, and segregates packaged petroleum products. Computes requirements for labor, equipment and facilities, and storage space. Assists in planning, coordination, and supervision of petroleum storage and distribution operations.

Serves as principal noncommissioned officer of company, battalion, comparable or higher unit engaged in storage, distribution, and issue of class III supplies. Supervises and inspects duties performed by subordinate noncommissioned officers of the unit. Holds sergeant major's or first sergeant's call to disseminate orders and items of information to subordinate enlisted commanders. Advises commanding officer on matters relative to troop welfare in terms of assignment, reassignment, promotion, privileges, discipline, training and supply. Indoctrinates new personnel of organization in military courtesy, customs of the service, and local regulations. Schedules military training. Assists in inspection of barracks, kitchens, other unit areas, and personnel. Makes notes of observed discrepancies and initiates appropriate corrective action. Assists command and staff officers in continuous appraisals of petroleum operations and training situations, and collects, prepares, and distributes material and data pertaining to petroleum operations and training.

Related Civilian Occupations:

DOT classification	Code
Dispatcher	5-49.401
Forman (pipelines)	5-95.080
Oil Checker	8-55.01
Oil Pumper	7-72.570
Pumper Helper	6-55.930

Federal Civil Service classification	Code
Fuel Distribution Systems Operating	WB 5413
Gasoline Pump Repairing	WB 5314

Heavy Vehcile Driver - MOS 642

Duties: Operates tractor-trailers, tank transporters, and similar heavy and special cargo vehicles to transport personnel, supplies, and equipment. Receives verbal and written instructions from dispatcher or truckmaster regarding type of cargo, loading point, route, destination, and similar information pertaining to assignment. Services vehicles with fuel, oil, water, and lubricants. Inspects vehicle components such as tires, lights, and exhaust system to assure safe operating conditions. Observes and supervises loading of vehicle to assure proper distribution of load and security of cargo against pilferage, shifting, or damage due to inclement weather. Operates vehicle singly or in convoy over various types of terrain. Maneuvers vehicle in close proximity to other objects, such as parked vehicles, loading platforms, and buildings. Completes individual driver trip ticket, listing such information as mileage, terminals, oil and gasoline added, and malfunctions noted during operation of vehicle. Cleans, oils, and lubricates vehicle and vehicle accessories in accordance with standard servicing charts and unit policies and procedures. Dispatches vehicles and drivers to accomplish specific motor transport missions.

Related Civilian Occupations:

DOT classification	Code
Truck Driver, Heavy........................	7-36.250

Truck Driver, Light........................	7-36.260

Federal Civil Service classification	Code
Traffic Controlling........................	GS 2151
Truck Driving..............................	WB 5708

Truckmaster - MOS 643

Duties: Coordinates and controls motor transport movements of personnel, supplies, and equipment including regulation of movements over highways. Determines type and number of vehicles and drivers required to accomplish specific motor transport operations. Directs and participates in preparation of vehicle maintenance, mileage, tonnage, fuel consumption, and status of equipment reports. Supervises operation of vehicles and enforces march discipline during convoy operations. Conducts driver training, and assures that all personnel are properly trained in preventive maintenance techniques, loading, documentation, and securing of cargo. Assures that dispatching of vehicles, preventive maintenance schedules, and similar functions conform to policies of unit. Serves as principal noncommissioned officer of company, battalion, comparable or higher unit engaged in motor transportation. Supervises and inspects duties performed by subordinate noncommissioned officers of unit. Holds sergeant major's or first sergeant's call to disseminate orders and items of information to subordinate enlisted commanders. Advises commanding officer and staff on matters relative to troop welfare in terms of assignment, reassignment, promotion, privileges, discipline, training, and supply. Indoctrinates new personnel of organization in military courtesy, customs of service, and local regulations. Schedules military training. Assists in inspection of barracks, kitchens, other unit areas, and personnel. Makes notes of observed discrepancies and initiates appropriate corrective action. Assists command and staff officers in continuous appraisal of motor transport operations and training situations, and collects, prepares, and distributes material and data pertaining to motor transport, operations and training.

Related Civilian Occupations:

DOT classification	Code
Chauffeur	7-36.050
Truck Driver, Heavy	7-36.250
Truck Driver, Light	7-36.260

Federal Civil Service classification	Code
Traffic Control	GS 2151
Truck Driving	WB 5708

Esoteric Skills (7)

Air Defense Missile Mechanic (Hawk) - MOS 227

Duties: Commands and controls organizational element of Hawk missile unit in assembly, installation, calibration, adjustment, and maintenance of on-missile electronic guidance control components and mechanical and hydraulic systems in Hawk launchers and launcher loaders and associated equipment. Serves as mechanic in performance of duties associated with these activities.

Related Civilian Occupations:

DOT classification	Code
Radar Equipment Foreman	5-92.621
Radar Mechanic	5-83.447
Radio Repairman	5-83.411

Federal Civil Service classification	Code
Electronic Equipment Inspecting	WB 2615
Electronic Equipment Making, Installing, and Repairing	WB 2614
Guided Missile Control Systems Inspecting	WB 2618
Guided Missile Control Systems Making, Installing, and Repairing	WB 2617
Radar Equipment Installing and Repairing	WB 2604

Field Artillery Missile Electronics Mechanic (Redstone)
MOS 218

Duties: Commands and controls organizational element of Redstone missile unit in assembly, installation, calibration, and maintenance of on-missile electronic guidance control components and associated electronic equipment, or serves as mechanic in performance of duties associated with this activity. Supervises or performs tests and adjustments on Redstone missile warhead.

Related Civilian Occupations:

DOT classification	Code
Radio Mechanic	5-83.447
Radio Repairman	5-83.411

Federal Civil Service classification	Code
Electronic Equipment Making, Installing, and Repairing	WB 2614
Guided Missile Control Systems Making, Installing, and Repairing	WB 2617

Launcher Control Repairman (Nike) - MOS 251

Duties: Inspects, tests, and performs maintenance and repair of Nike launcher control electrical and electronic components and associated test equipment. Utilizes special electronic test equipment to isolate malfunctioning components and faulty circuitry and circuit elements. Removes and replaces faulty parts and components by disconnecting terminal type connections and breaking permanent type connections. Utilizes test equipment to test and adjust components to specified tolerances. Performs checkout and alinement of entire launcher control system. Performs comparison checks, adjusts, and repairs test equipment. Installs modifications on organizational and field maintenance equipment in accordance with modification orders. Inspects organizational maintenance of Nike launcher control electrical and electronic systems and associated test equipment. Instructs organizational maintenance personnel in proper organizational maintenance techniques and procedures and changes caused by modification of equipment.

Related Civilian Occupations:

DOT classification	Code
Electrical Instrument Repairman............	5-83.975
Radio Repairman............................	5-83.411
Television Service and Repairman...........	5-83.416

Federal Civil Service classification	Code
Electronic Equipment Inspecting............	WB 2615
Electronic Equipment Making, Installing, and Repairing............................	WB 2614

Electronic Test Equipment Making and Repairing	WB 2602
Electronic Test Equipment Operating	WB 2607
Guided Missile Repairing	WB 2617
Guided Missile Inspecting	WB 2618

Internal Guidance Repairman (Nike) - MOS 254

Duties: Inspects, repairs, and performs field maintenance of Nike missile internal guidance system. Utilizes field maintenance test equipment to determine general causes of malfunction. Removes malfunctioning components from Nike internal guidance system for further testing. Determines necessary repairs and replacements, or salvability. Performs repair or replacements and reinstallation of internal guidance components. Assists in final checkout of repaired missile. Utilizes all field maintenance test equipment associated with Nike internal guidance system, and tests, performs comparison checks, adjusts, and repairs all such test equipment as authorized. Participates in general shop planning and recommends establishment of procedures for receipt, storage, inspection, testing, and repair of components. Instructs subordinate personnel in on-the-job training programs in maintenance of internal guidance system, and use and maintenance of field maintenance test equipment. Inspects organizational maintenance methods and procedures in using unit. Instructs using units' operating personnel on performance of organizational maintenance. Installs modifications on equipment. Serves as principal noncommissioned officer of company and supervises and inspects duties performed by subordinate noncommissioned officers. Disseminates orders and items of information to subordinate enlisted commanders. Advises commanding officer on matters relative to troop welfare in terms of assignment, reassignment, promotion, privileges, discipline, training, and supply. Indoctrinates new personnel of organization in military courtesy, customs of service, and local regulations. Forms unit for drill, fatigue, guard, and other military formations. Schedules military training. Assists in inspection of unit area, makes notes of observed discrepancies, and initiates appropriate corrective action.

Related Civilian Occupations:

DOT classification	Code
Electrical Instrument Repairman	5-83.975
Radio Repairman, Domestic	5-83.411
Television Service and Repairman	5-83.416

Federal Civil Service classification	Code
Electronic Equipment Inspecting	WB 2615
Electronic Test Equipment Operating	WB 2607
Guided Missile Control Systems Making, Installing, and Repairing	WB 2617
Radar Equipment Inspecting	WB 2606
Radar Equipment Installing and Repairing	WB 2604

Internal Guidance Repairman (Hawk) - MOS 257

Duties: Inspects, tests, and performs field maintenance and repair of Hawk internal guidance and launcher electronics systems and peculiar test equipment. Utilizes special electronic test equipment to isolate malfunctioning components by disconnecting terminal type connections and breaking permanent type connections. Utilizes test equipment to test and adjust components to specified tolerances. Performs checkout and alinement of entire Hawk internal guidance and launcher electronics systems. Performs comparison checks, adjusts, and repairs test equipment as authorized. Installs modifications on internal guidance and launcher electronics equipment and organizational and field maintenance equipment in accordance with modification work orders. Inspects organizational maintenance of Hawk internal guidance and launcher electronics systems components and associated test equipment. Performs visual inspections, continuity checks and removes and replaces all conventional warheads and explosive components in Hawk missile. Removes, replaces, and inspects mechanical components of missile and launcher. Inspects, installs, and removes conventional warheads and explosive components. Instructs organizational maintenance personnel in proper organizational maintenance techniques and procedures and changes caused by modification of equipment. Serves as principal noncommissioned officer of company and supervises and inspects duties performed by subordinate noncommissioned officers. Disseminates orders and items of information to subordinate enlisted commanders. Advises commanding officer on matters relative to troops welfare in terms of assignment, reassignment, promotion, privileges, discipline, training, and supply. Indoctrinates new personnel of organization in military courtesy, customs of service, and local regulations. Forms unit for drill, fatigue, guard, and other military formations. Schedules military training. Assists in inspection of unit area, makes notes of observed discrepancies, and initiates appropriate corrective action.

Related Civilian Occupations:

DOT classification	Code
Electrical Instrument Repairman	5-83.975
Radio Repairman, Domestic	5-83.411
Television Service and Repairman	5-83.416

Federal Civil Service classification	Code
Electronic Equipment Inspecting	WB 2615
Electronic Test Equipment Operating	WB 2607
Guided Missile Control Systems Making, Installing, and Repairing	WB 2617
Radar Equipment Inspecting	WB 2606
Radar Equipment Installing and Repairing	WB 2604

Armament Maintenance Helper - MOS 420

Duties: Assists in calibration and repair of all types of artillery and small arms. Performs disassembly of weapons and components as directed. Transports spare parts and specialized tools from storeroom to working area. Cleans components of dirt, rust, and corrosion. Removes burrs, scratches, and scoring from bearing surfaces of pinions, gears, and shafts using files, rasps, and crocus cloth. Lubricates moving parts with prescribed grade and quantity of oil or grease. Performs reassembly of simple weapon components. Paints and waterproofs weapons equipment, and prepares weapons for storage or shipment. Emplaces and performs routing operation of specialized equipment used to test muzzle velocity of artillery pieces. Inventories, cleans, and lubricates spare parts, tools, and equipment. Cleans shop and work area and stores spare parts and tools in proper containers and racks. Performs minor administrative duties. Drives and performs preventive maintenance on light and heavy wheel vehicles.

Related Civilian Occupations:

DOT classification	Code
Armament Mechanic	5-83.543
Assembler IV	8-93.77

Federal Civil Service classification	Code
Artillery Assembling	WB 6602
Artillery Disassembling	WB 6603
Artillery Repairing	WB 6605
Small Arms Assembling	WB 6607
Small Arms Disassembling	WB 6608
Small Arms Repairing	WB 6610

Turret Artillery Repairman - MOS 424

Duties: Maintains repairs and rebuilds turret mechanisms and turret weapons of tanks and other combat vehicles and similar ordnance materiel. Inspects and test turret-mounted weapons and mechanisms to determine nature and causes of malfunction, and determines corrective action required. Operates components of turret-mounted weapons to determine serviceability. Removes weapon assemblies for repair, replacement, or rebuilding. Operates hoisting equipment to move and position heavy parts. Disassembles groups or assemblies, measures tolerance of parts with precision instruments and special tools, and replaces unserviceable or nonrepairable parts. Observes action of main electrical, hydraulic, and mechanical components for evidence of abnormal operation. Traces circuits by referring to schematic diagrams and visually inspects circuits for faulty insulation, poor electrical contacts, and broken or worn electrical components. Analyzes and tests continuity of circuits by utilizying test equipment such as ohmmeter, voltmeter, and null-voltage test set. Sends parts to be repaired to appropriate shop sections. Performs such repair operations as filing, honing, grinding, and drilling, using hand and power tools. Cleans and lubricates parts and assemblies. Assembles and installs assemblies on turret mechanisms and turret weapons. Inspects, tests, and adjusts weapons and components to assure that materiel functions properly. Fires weapons to test functioning of components. Repairs or recovers damaged turret mechanisms and turret weapons of tanks and other combat vehicles. Salvages parts from nonreparable weapons. Modifies weapons in accordance with current modification orders.

Related Civilian Occupations:

DOT classification	Code
Artillery-Maintenance Foreman	5-92.392
Armament Machinist	4-75.010

Armament Foreman	0-99.93
Assembler III	6-93.770

Federal Civil Service classification	Code
Civilian Gunnery	WB 6606
Artillery Assembling	WB 6602
Artillery Disassembling	WB 6603
Artillery Inspecting	WB 6604
Artillery Repairing	WB 6605

Electronic Countermeasures Specialist - MOS 992

Duties: Operates multipurpose jamming, variable time fuse jamming, and associated equipment to intercept, analyze, and locate enemy electronic radiating devices and jam such devices other than communications emitters. Assists in installation of receiving and transmitting equipment and antennas. Tunes receivers and searches for enemy signals. Analyzes characteristics of intercepted signal to determine type of source. Operates direction finding equipment to locate signal source. Operates recording equipment to provide basis for identification and recording of enemy equipment emissions and their susceptibility to jamming. Selects and interconnects suitable equipment for jamming individual signals. Calibrates transmitter to proper frequency and selects correct antenna and location for optimum output signal. Operates and performs operator maintenance of power equipment. Installs and operates internal communications network for reporting and coordinating purposes. Performs preventive maintenance on countermeasures equipment. Supervises electronic countermeasures search and jamming operations. Assists in selection of equipment sites. Corrects faulty work performance and instructs in proper operating procedures and techniques. Supervises maintenance of operational logs. Prepares routing and special reports pertaining to electronic countermeasures activities. Serves as principal noncommissioned officer of company, battalion, comparable, or higher unit primarily engaged in electronic countermeasures activities. Supervises and inspects duties performed by subordinate noncommissioned officers of unit. Holds sergeant major's or first sergeant's call to disseminate orders and items of information to subordinate enlisted commanders. Advises commanding officer and staff on matters relative to troop welfare in terms of assignment, reassignment, promotion, privileges, discipline, training, and supply. Indoctrinates new personnel of organization in military courtesy, customs of service, and local regulations. Schedules military training. Assists in inspection of barracks, kitchens, other unit areas, and personnel. Makes notes of observed discrepancies and initiates appropriate corrective action. Assists command and staff officers in continuous appraisal of electronic countermeasures operations and training situations, and collects, prepares, and distributes material and data pertaining to electronic countermeasures operations and training.

Related Civilian Occupations:

DOT classification	Code
Radio Intelligence Operator	0-61.34
Radar Operator	0-61.

Federal Civil Service classification	Code
Radio Operating	GS 389

Countermeasures Search Specialist - MOS 993

Duties: Operates electronic search and associated equipment and analyzes data received from such equipment. Positions, interconnects, and test operates equipment. Adjusts equipment controls and searches assigned segment of spectrum, observing intercepted emissions on visual indicators. Notes data pertaining to characteristics of received signals, makes recording of intercepted electronic signals, and identifies recording by assigning it an intercept number. Analyzes data received from search receivers. Monitors friendly electronic radiation activities to insure proper operation. Posts and maintains operational logs and makes intercept and special reports. Performs preventive maintenance on countermeasures search and associated equipment. Supervises countermeasures search and analysis activities. Selects suitable locations for equipment within designated areas. Supervises emplacement and installation of equipment. Prepares and disseminates work schedules and operating procedures. Corrects improper procedures by instruction and demonstration. Supervises organizational maintenance of equipment. Reviews, consolidates, and prepares technical, operational, and administrative reports.

Related Civilian Occupations:

DOT classification	Code
Radio Operator	0-61.

Federal Civil Service classification	Code
Radio Operating	GS 389

Combat Infantry (8)

Light Weapons Infantryman - MOS 111

Duties: Commands and controls infantry light weapons squad, section, or platoon, and employs individual weapons or assists in employment of crew-served light infantry weapons in offensive and defensive combat operations. Directs deployment of personnel and selects sites for emplacement of weapons. Assigns fields of fire, general target areas, or type targets. Selects ammunition type appropriate for utilization against specific targets. Orders fire to destroy enemy personnel, weapons, or equipment. Observes and adjusts fire. Directs use of fire and movement to neutralize or destroy enemy personnel and materiel. Commands combat patrols engaged in obtaining combat information. Instructs replacement personnel in all phases of tactical employment of infantry light weapons. Supervises construction of hasty field fortifications, security of unit, organizational maintenance of weapons and equipment, and receipt, storage, and distribution of food, supplies, and ammunition. Serves as gunner of crew-served light infantry weapons and lays weapon using direct fire sights. Assists gunner of crew-served light infantry weapons. Carries and prepares ammunition for use. Closes with enemy, using individual weapons. As member of combat patrols obtains combat information. Prepares rough maps, field sketches, and overlays to indicate location of critical terrain features and enemy activities. Lays field wire and operates radio telephone and field telephone equipment. Assists in operation of ammunition supply point. Prepares simple demolitions and assists in construction of field fortifications, road blocks, wire entanglements, and mine fields. Performs preventive maintenance and assists in performance of organizational maintenance of weapons and equipment.

Related Civilian Occupations: none

Heavy Weapons Infantryman - MOS 112

Duties: Commands and controls infantry heavy weapons squad, section, or platoon, and employs individual weapons to protect position, or assists in employment of crew-served heavy infantry weapons in offensive and defensive combat operations. Directs deployment of personnel and selects sites for emplacement of weapons. Assigns fields of fire, general target areas, or type targets. Selects ammunition type appropriate for utilization against specific targets. Orders fires on selected targets, observes fires for effectiveness, and coordinates and adjusts fires. Supervises and assists in operation of infantry fire direction center in preparation for firing data. Conducts surveys to determine location of points essential for effective infantry fire. Instructs replacement personnel in all phases of tactical employment of infantry heavy weapons. Supervises construction of hasty field fortifications, security of unit, organizational maintenance of weapons and equipment, and receipt, storage, and distribution of food, supplies, and ammunition. Serves as gunner of crew-served heavy infantry weapons and lays weapon for direct and indirect fire missions. Assists gunner of crew-served heavy infantry weapons. Carries and prepares ammunition for use. Lays field wire and operates radio telephone and field telephone equipment. Drives prime movers used to transport infantry heavy weapons. Performs preventive maintenance and assists in performance of organizational maintenance of weapons and equipment. Related Civilian Occupations: none

Duty Soldier (9)

Duty Soldier - MOS 540

Duties: Performs variety of unskilled labor in service and support companies, and in labor pools. Loads and unloads supplies and equipment to and from ships, docks, beaches, box cars, and warehouses. Handles, loads, and unloads clothing and other items before, during, and after laundry and drycleaning processing. Assists in operation of laundry and drycleaning equipment. Performs unskilled manual labor in connection with clothing exchange activities. Assists in operation of shower bath units. Operates delousing equipment and fumigation cabinets. Digs graves and assists in evacuation and burial of deceased personnel subject to military jurisdiction. Operates and tends foundry furnaces. Pours molten metal into molds and cleans castings. Repairs tires and inner tubes and assists in performance of operator's maintenance on tire buffers, molds, vulcanizers, and other shop equipment. Fells trees, trims branches, saws trunks into logs, and hauls or drags to sawmill. Saws logs and stacks lumber at mill. Digs ditches and makes minor repairs to roads, railway roadbeds, and appurtenant structures. Assists in repair, replacement, and operator's maintenance of rails, switches, frogs, and power-supplying third rails. Makes minor repairs to buildings, fences, crossing gates, and signposts. Polices buildings, loading areas, and railway right-of-way of debris and obstructions. Assists in performance of nontechnical and nonskilled portions of other military occupational specialties.

Related Civilian Occupations:

DOT classification	Code
Grave Digger	9-89.91
Laundryman	7-57.005
Stevedore	7-47.100

Tire Repairer	4-57.212
Truckman	9-32.01

Federal Civil Service classification	Code
Foundry Working	WB 3708
Laboring	WB 3502
Laundry Working	WB 7304
Saw Mill Operating	WB 4608
Tire and Tube Repairing	WB 4504

Clerical Skills (10)

Clerk - MOS 710

Duties: Performs clerical and related duties in military unit. Posts, codes, and files regulations, correspondence, requisitions, status cards, and other materials. Distributes incoming requisitions, regulations, correspondence, bulletins, orders, and catalogs to proper section or subsection of unit. Proofreads written data against source materials. Operates ditto, mimeograph, adding, posting, and addressograph machines. Handles bulk mail and assists in its preparation for dispatch. Assists qualified specialists in performance of their duties to gain proficiency in performance of administrative duties.

Related Civilian Occupations:

DOT classification	Code
Clerk, General	1-04.01
Clerk, General Office	1-05.01
Clerk-Typist	1-37.34

Federal Civil Service classification	Code
General Clerical and Administrative	GS 301
Mail and File	GS 305
Miscellaneous Office Appliance Operating	GS 350

Clerk-Typist - MOS 711

Duties: Performs typing and related duties. Organizes and types correspondence, orders, recurring and special reports, and similar material based on written notes or verbal instructions. Posts, codes, and files regulations, correspondence, and similar materials. Distributes incoming communications. Proofreads typewritten material against source material. Operates office machines such as varitype, mimeograph, posting, and adding machines.

Related Civilian Occupations:

DOT classification	Code
Clerk, General	1-04.01
Clerk, General Office	1-05.01
Clerk-Typist	1-37.34

Federal Civil Service classification	Code
Clerk-Typist	GS 322
Dictating Machine Transcriber	GS 314
General Clerical and Administrative	GS 301
Typist	GS 320

Stenographer - MOS 712

Duties: Takes and transcribes dictation of correspondence, telephone conversations, discussions in staff meetings, investigations, and other information for which a typewritten record is desired. Receives and refers telephone calls and visitors. Arranges appointments, conferences, and interviews. Prepares correspondence, sets up and keeps office files current, and performs related clerical and administrative type duties. Takes and transcribes dictation of proceedings, and organizes material in form required by regulations or as desired by superior.

Related Civilian Occupations:

DOT classification	Code
Stenographer	1-37.12

Federal Civil Service classification	Code
Clerk Stenographer	GS 312
Secretary	GS 318
Stenographer	GS 310

Legal Clerk or Court Reporter - MOS 713

Duties: Assists in preparation and processing of summary, special, and general court-martial records, line of duty investigations, reclassification board proceedings and claims investigations, and takes verbatim notes of activities and statements in legal proceedings. Assures that charges are properly prepared and that specifications are complete and accurate. Makes initial determination as to jurisdiction of court, person of accused, and subject matter of offenses. Prepares special orders appointing court-martial and court of inquiry, and prepares indorsements referring charges for trial. Records complete details of statements and activities during proceedings by identifying participants, placing identifying marks on all supplemental material, and taking verbatim notes of statements of participants. Transcribes notes of proceedings to form required by regulations.

Examines completed records of line-of-duty investigations, reclassification board proceedings, claims investigations, and other records requiring legal review to insure that they are administratively correct. Prepares special court-martial orders promulgating sentence. Assures that records of court-martial are correct and complete before disposing of case. Transmits bad conduct discharge court-martial cases to The Judge Advocate General's Office. Examines and distributes incoming correspondence, directives, publications, and other communications. Supervises cataloging and filing of Army publications, books, periodicals, journals, and similar materials. Requisitions office supplies and equipment, and performs similar administrative and supervisory duties to assure accurate processing of records within prescribed time limits. Maintains records of discipline administered within command. Assists in gathering legal procedure data.

Related Civilian Occupations:

DOT classification	Code
Court Reporter	1-37.18
Law Clerk	0-68.48

Federal Civil Service classification	Code
Closed Microphone Reporter	GS 319
Legal Clerical and Administrative Clerk	GS 986
Shorthand Reporter	GS 312

Postal Clerk - MOS 714

Duties: Performs postal duties in Army postal unit or base post office. Accepts, processes and delivers registered and insured mail. Issues and pays postal money orders and sells stamps. Determines acceptability of mail and computes postage and special service requirements therefor. Accepts, distributes, dispatches, and delivers all classes of mail. Maintains records of postal financial transactions and workload and prepares required reports. Keeps account of money order and stamp funds in accordance with Post Office Department and Army regulations. Prepares, changes and purges locator cards. Examines undeliverable mail to determine proper disposition, such as forwarding or returning to sender. Organizes work and supervises activities of base post office or postal regulating detachment personnel by assigning duties, reviewing work performed, and assisting subordinates with more difficult tasks. Makes inspections to assure that prescribed security regulations are obeyed. Assists postal officers in matters pertaining to operations and training of postal personnel and distributes material and data pertaining to such operations and training.

Related Civilian Occupations:

DOT classification	Code
Mail Carrier	1-28.10
Mail Racker	1-27.11

Mail Sorter	1-31.10
Post Office Clerk	1-27.20
Post Office Clerk	1-12.38

Federal Civil Service classification	Code
Mail and File	GS 305

Finance Clerk - MOS 730

Duties: Serves as check writer, bond issue clerk, abstract clerk, accounting clerk, and as clerk-typist in disbursing, finance and accounting, and audit offices. Prepares and types checks, makes entries in check register including totals of checks drawn and deposits and transfers of check accountability. Prepares and types bonds. Keeps ledgers and submits reports related to bond preparation. Verifies accuracy of bond accounting report by reference to collection and disbursement vouchers. Keeps files of documents pertaining to finance activities. Prepares routine letters of transmittal, types correspondence and reports. Performs routine and elementary tasks to assist finance specialist personnel. Performs simple computations including pay due military personnel and mileage or per diem vouchers for civilian or military personnel and commercial vouchers. Assists bookkeepers by preparing vouchers for scheduling and recording, preparing worksheet totals, keeping account current records and files and similar tasks. Assists accounting personnel in keeping fiscal and costs accounts related to status of funds and reports and in preparing analyses required for budget purposes, maintaining general ledger and other accounts required by integrated accounting system in in preparing financial statements. Assists audit personnel in preparing audit reports and similar tasks. Performs messenger and supply duties.

Related Civilian Occupations:

DOT classification	Code
Accounting Clerk	1-01.31
Clerk-Typist	1-37.34
General Office Clerk	1-05.01

Federal Civil Service classification	Code
Accounting and Fiscal Clerk	GS 501

Audit Specialist - MOS 731

Duties: Audits financial management and related activities of Army installations and select civilian contractors for Army Audit Agency to determine condition of accounts and conformance with established regulations and directives. Analyzes procedures for control of expenditures, including segments of appropriated, non-appropriated, and funded accounts. Verifies costs by examination of supporting vouchers. Reconciles subsidiary accounts ledger with general ledgers. Analyzes balance sheet accounts for correct classification of transactions and conformity with accepted accounting procedures. Evaluates local purchase procedures for conformity with regulatory controls. Verifies personnel actions involving pay matters. Examines travel vouchers for compliance with regulations. Performs industrial cost type audits on proposed, current, and completed government contracts, including spot checks, verifications, and appraisals of accounting areas covering material, labor, and other direct charges. Determines overhead rates by verifying general and administrative expenses. Determines consistency of method of allocating expenses and allocations to contract costs. Compares schedules with actual quality, quantity, and delivery dates. Identifies and prepares comparative analyses of account balances and reviews entries in reserve and surplus accounts influencing contract costs. Observes control and use of scrap and returnable containers. Inspects management of Government property. Reviews personnel records of contractors on cost-plus contracts to determine if employees are charged to correct jobs. Verifies payrolls against general ledger accounts. Insures that fully depreciated assets are not used in computing depreciation costs. Submits and reports on results of audits performed and makes recommendations on methods, procedures, and corrections.

Related Civilian Occupations:

DOT classification	Code
Accountant, General...........................	0-01.20
Auditor..	0-01.60

Federal Civil Service classification	Code
Auditor or Accountant........................	GS 510

Disbursing Specialist - MOS 732

Duties: Supervises or prepares, computes, and processes vouchers for payment of civilian pay and allowances and commercial invoices and supervises computation or computes military pay and allowances to include travel allowances, in nonintegrated disbursing offices and examination and disbursing sections of integrated Finance and Accounting offices. Prepares summary and certification sheet by summarizing military pay vouchers to provide full accounting for military pay by individual code. Summarizes, opens, and closes civilian pay records and cross disbursing military pay records. Keeps records of disbursements and collections to reflect accountability of Disbursing Officer or Finance and Accounting Officer. Prepares and reviews accounting records and reports. Posts and maintains cash blotter. Receives cash collections and makes payment to military and civilian personnel and commercial firms upon presentation of proper claim. Examines and reviews military pay instruments prepared in unit personnel offices. Assigns work and instructs in unusual and complex cases. Supervises personnel assigned to finance sections of division or higher headquarters. Serves as principal noncommissioned officer of finance school company, comparable, or higher unit. Supervises and inspects duties performed by subordinate noncommissioned officers of unit. Holds sergeant major's or first sergeant's call to disseminate orders and items of information to subordinate enlisted commanders. Advises commanding officer and staff on matters relative to troop welfare in terms of assignment, reassignment, promotion, privileges, discipline, training, and supply. Indoctrinates new personnel of organization in military courtesy, customs of the service, and local regulations. Schedules military training. Assists in inspection of barracks, kitchens, other unit areas, and personnel. Makes notes of observed discrepancies and initiates appropriate corrective action.

Related Civilian Occupations:

DOT classifications	Code
Bookkeeper II	1-01.02
Cashier I	1-01.52
Payroll Clerk	1-26.02

Federal Civil Service classification	Code
General Accounting Clerical and Administrative	GS 501
Military Time, Leave, and Pay	GS 546

Accounting Specialist - MOS 733

Duties: Prepares reports, estimates, and analyses required for budget purposes and keeps cost and fiscal accounts related to status of appropriated funds. Determines propriety of proposed obligations. Records estimated obligation amounts and keeps document files to support ledger entries. Keeps allotment ledger accounts and prepares reports on allotment of funds received. Prepares adjustment documents to correct accounting errors. Closes and balances allotment ledger accounts at specified time intervals and prepares reports showing balances and totals of the accounts. Examines fiscal documents to verify accounting classifications. Keeps cost accounting ledgers. Prepares cost reports and correspondence concerning funds, supply transactions and similar matters. Assists in preparation of budget estimates and other financial statements to provide data for management and budget purposes. Keeps general ledger accounts for control and distribution of allocated funds. Reviews requests for funds and issues allotments as authorized. Maintains detailed accounts of combined appropriation and expenditure accounting, revenue accounting, and related reporting. Maintains detail or control accounts of consumer funding, financial property accounting, stock fund, industrial fund, and related reporting. Establishes comparisons of interrelated reports and records, and localizes or reconciles errors found to exist. Supervises personnel engaged in accounting activities. Reviews work and advises on unusual or complex cases.

Related Civilian Occupations:

DOT classification	Code
Accounting Clerk	1-01.31
Budget Clerk	1-01.05
Cost Clerk	1-01.35

Federal Civil Service classification	Code
Accounting and Fiscal Clerk	GS 501

Navy Occupations

Operatives (1)

Machinist's Mate

Duties: Machinist's Mates operate, maintain, and make repairs to ship-propulsion and auxiliary equipment, such as steam-propulsion machinery, bearings, shafts, propellers, evaporators, compressors, pumps, valves, piping, oil purifiers, heat exchangers, governors, and reduction gears; maintain and make repairs to outside machinery, such as steering engine, anchor windlass, cranes, winches, elevators, and food preparation and related utility equipment; operate, maintain, and repair refrigeration and air-conditioning equipment; and may perform duties in the generation, stowage, and transfer of the following industrial gases: oxygen, carbon dioxide, nitrogen, and acetylene.

Shipfitter

Duties: Shipfitters plan, supervise, and perform tasks necessary for fabrication, installation, and repair of metal structures and installation and maintenance of shipboard and shore-based plumbing and high- and low-pressure piping systems; organize, supervise, and train personnel in maintenance and repair duties; supervise and perform tasks in procurement and issuance of supplies and repair parts; instruct personnel and enforce safety precautions; prepare records and reports; and perform tasks associated with damage control.

Boilerman

Duties: Boilermen operate marine boilers and fireroom machinery; transfer, test, and take inventory of fuels and water; maintain and repair biolers, pumps, and associated machinery; and perform various administrative functions.

Electrician's Mate

Duties: Electrician's Mates stand watch on generators, switchboards, and control equipment; operate electrical equipment; maintain and repair power and lighting circuits, electrical fixtures, motors, generators, distribution switchboards, and other electrical equipment; test for short circuits, grounds, or other casualties; and repair and rebuild electrical equipment in an electrical shop.

Telephone Trades (2)

Interior Communications Electrician

Duties: Interior Communications Electricians maintain and repair interior communications (IC) systems, gyrocompass systems, amplified and unamplified voice systems, and related equipment; and stand IC and gyrocompass watches.

Aircraft Mechanics (3)

Aviation Electronics Technician

Duties: Aviation Electronics Technicians inspect and maintain aviation electronic equipment except ASW equipment, including:

detection, reconnaissance, identification, communication, navigation, display, and special purpose equipment; target drone and pilotless aircraft equipment; and related equipment and test equipment; and operate airborne CIC equipment.

Aviation Electronics Technician N (Radio and Radio Navigation Equipment)

Duties: Aviation Electronics Technicians (N) inspect and maintain aviation electronic identification, radio communication, and radio navigation equipment, including: radio transmitting, receiving, relaying, and direction finding equipment; radio and radar altimeters; electronic interrogating and transponding equipment; distance and time difference measuring equipment; and related equipment and test equipment.

Aviation Electronics Technician R (Radar and Radar Navigation Equipment)

Duties: Aviation Electronics Technicians (R) inspect and maintain aviation radar and electronic identification equipment, including: radar; radar display and relay equipment; electronic interrogating and transponding equipment; and related equipment and test equipment.

Aviation Machinist's Mate

Duties: Aviation Machinist's Mates inspect and maintain powerplants and powerplant-related systems and equipment in aircraft with reciprocating or jet engines; prepare aircraft for flight; conduct periodic aircraft inspections; service, test, adjust, remove, replace, preserve, and depreserve powerplants and powerplant-related systems and accessories; and supervise powerplant shops.

Aviation Machinist's Mate J (Jet Engine Mechanic)

Duties: Aviation Machinist's Mates (J) maintain aircraft jet engines and their related systems including the induction, cooling, fuel, oil, compression, combustion, turbine, and exhaust systems; preflight aircraft; perform intermediate and major inspections on jet engines and engine-related systems; field-test and adjust components of the engine including fuel controls, pumps, valves, and regulators; remove, repair and replace compressor and turbine blades, and combustion chamber liners; preserve and depreserve jet engines, engine accessories, and components; and supervise jet engine shops.

Aviation Machinist's Mate R (Reciprocating Engine Mechanic)

Duties: Aviation Machinist's Mates (R) maintain aircraft reciprocating engines and their related systems including the fuel, oil, ignition, propeller, and exhaust systems; preflight aircraft; perform intermediate and major inspections on reciprocating engines and engine-related systems; test, adjust, remove, replace, preserve, and depreserve engines and engine accessories including: carburetors, magnetos, pumps, and other components of the engine and its systems; and supervise reciprocating engine shops.

Aviation Structural Mechanic

Duties: Aviation Structural Mechanics inspect, maintain, and repair aircraft, airframe, and structural components and surfaces - movable structures and surfaces and their hydraulic and pneumatic control and actuating systems and mechanisms - air-conditioning, pressurization, visual improvement, oxygen, and other utility systems - seat and canopy ejection systems and components - egress systems; fabricate and repair metallic and non-metallic materials; and supervise operation of airframe shops.

Aviation Structural Mechanic E (Safety Equipment)

Duties: Aviation Structural Mechanics (E) maintain safety belts, shoulder harnesses, and integrated flight harnesses in aircraft, inertia reels, seat and canopy ejection systems, gaseous and liquid oxygen, liferaft ejection systems, fire extinguishing systems excluding fire detection systems, portable fire extinguishers, emergency egress systems, air-conditioning, heating, cabin and cockpit pressurization, ventilating, and anti-G systems, visual improvement systems, other utility systems, and associated lines, fittings, rigging, valves, and control mechanisms; replenish liquid and gaseous oxygen systems; remove and install oxygen system valves, gages, converters, and regulators; inspect, remove, install, and rig ejection seats, shoulder harness, lap belts, and face-curtain mechanisms; inspect, remove, install, and adjust firing mechanisms and cartridges for ejection seats, lap belts, and canopies; operate and maintain liquid nitrogen and liquid and gaseous oxygen shop transfer and recharge equipment; perform daily and preflight, intermediate, and major aircraft inspections.

Aviation Structural Mechanic H (Hydraulics)

Duties: Aviation Structural Mechanics (H) maintain hydraulic systems including main and auxiliary power systems and unit actuating subsystems, landing gear excluding wheels and tires, brakes, related pneumatic systems including reservoir pressurization and emergency actuating systems and associated pumps, valves, regulators, actuating cylinders, lines and fittings; service pressure accumulators, emergency air bottles, oleo struts, reservoirs, and master brake cylinders; inspect, remove, and replace components of hydraulic systems; bleed hydraulic systems; adjust brakes and replace linings and pucks; replace gaskets, packing, and wipers in hydraulic components; and perform daily and preflight, intermediate, and major aircraft inspections.

Aviation Structural Mechanic S (Structures)

Duties: Aviation Structural Mechanics (S) maintain aircraft fuselages, wings, fixed and movable surfaces, airfoils, empennages, seats except ejection seats, wheels and tires and their components, controls, and mechanisms; remove, install, and rig flight control surfaces; fabricate and assemble metal parts and make minor repairs to aircraft skin; install rivets and metal fasteners; buildup wheels and tires; paint; perform dye penetrant inspections; and perform daily and preflight, intermediate, and major aircraft inspections.

Aviation Electrician's Mate

Duties: Aviation Electrician's Mates inspect and maintain aircraft electrical and instrument systems, including: power generation, conversion, and distribution systems; interior and exterior lighting; electrical components of aircraft controls, including airframe, engine, propeller, and utility control systems; aircraft electrical starting systems, including starters, starting controls, and ignition system components, aircraft engine, flight, and navigation instruments, instrument systems, and noninstrument-type indicating and warning systems; aircraft automatic flight control systems, including automatic pilots, automatic flight stabilization systems, aircraft compasses, and attitude reference systems; aircraft batteries; and related electrical components; and test and adjust auxiliary electrical power units and test equipment.

Teamster (4)

Storekeeper

Duties: Storekeepers order, receive, inspect, stow, preserve package, ship, and issue materials and cargo; account for property, equipage, supplies and materials (exclusive of aviation equipage, supplies, and materials) belonging to the Navy; and prepare and maintain required forms, records, correspondence, reports, and files.

Esoteric I (Electronic) (5)

Electronics Technician

Duties: Electronics Technicians maintain, repair, calibrate, tune, and adjust electronic material used for communication, detection, tracking, recognition and identification, aids to navigation, electronic countermeasures, and radiac. (Exceptions: airborne equipment, data transmission system, interior communications systems, teletypewriter machines, sonar, and weapons control systems.)

Radarman

Duties: Radarmen perform basic and control functions of CIC as plotters, operators, status-board keepers, and talkers; maintain CIC displays; advise on capabilities, limitations, and condition of assigned equipment; apply a thorough knowledge of CIC doctrine and procedures contained in NWP and NWIP publications, tactical doctrine and procedures contained in ATP, NWP, and NWIP publications, operational communications doctrine and procedures contained in ATP, ACP, JANAP, DNC, NWP, and NWIP publications, and hydrographic procedures necessary for radar navigation contained in

Hydrographic Office publications; and operate, perform operational and preventive maintenance on, and locate common circuit failures in, surveillance and altitude-determining radars, IFF, ECM, radio-telephone, and associated equipment.

Radioman

Duties: Radiomen transmit, receive, log, route, file, and maintain security of messages in accordance with existing regulations, instructions, and procedures, by applying thorough knowledge of the Department of the Navy Security Manual for Classified Information and the communications doctrine and procedures contained in DNC 5 and NWIP 16-1; advise on capabilities, limitations, and condition of assigned equipment; operate typewriter and teletypewriter equipment; tune radio transmitters and receivers; and operate and perform operational and preventive maintenance and repair on, and locate the more common failures in, radio and teletype equipment, including associated frequency shift keyers, converters, motors, motor generators and power supplies; and radiotelephone and other assigned communications equipment.

Esoteric II (Mechanical) (6)

Engineman

Duties: Enginemen operate, maintain, and repair internal-combustion engines; and operate and maintain auxiliary engineroom, refrigeration, and air conditioning equipment.

Quartermaster

Duties: Quartermasters stand watch as assistants to officers of the deck and to the navigator; serve as steersmen and perform ship control, navigation, and bridge watch duties; procure, correct, use, and stow navigational and oceanographic publications and oceanographic charts; maintain navigational instruments and keep correct navigational time; render "honors and ceremonies" in accordance with national observance and foreign customs; send and receive visual messages, and serve as petty officers in charge of tugs, self-propelled barges, and other yard and district craft.

Weapons (7)

Fire Control Technician

Duties: Fire Control Technicians operate, test, maintain, and repair weapon control systems (excluding surface-ship underwater weapon control systems and launchers); perform missile testing and telemetering; make detailed mechanical, electrical, and electronic casualty analyses; and maintain and repair associated test and telemetering equipment.

Fire Control Technician G (Gun Fire Control)

Duties: Fire Control Technicians (G) operate, test, maintain, and repair gun fire control systems (including target designation systems and submarine weapon control systems) and associated test equipment.

Fire Control Technician M (Missile Fire Control)

Duties: Fire control Technicians (M) operate, test, maintain, and repair missile fire control systems, including weapon direction systems; test missiles; and operate, maintain, and repair associated missile test and telemetering equipment.

Gunner's Mate

Duties: Gunner's Mates operate, maintain, and repair guided-missile launching systems, missile launching groups, rocket launchers, guns, gun mounts, turrets, projectors, and associated handling equipment; make detailed electrical, electronic, hydraulic, and mechanical casualty analyses; maintain and repair the various electric, electronic, hydraulic, and mechanical systems and servosystems in the above; test and inspect ammunition and missiles and their ordnance components; inspect and maintain magazines and ammunition stowage spaces; supervise crews assigned to ordnance equipment; maintain histories, logs, and records; and prepare reports.

Gunner's Mate G (Guns)

Duties: Gunner's Mates (G) operate, maintain, and repair guns, gun mounts, turrets, rocket launchers, projectors, associated handling equipment, and small arms; make detailed electrical, electronic, hydraulic, and mechanical casualty analyses; maintain and repair electric, electronic, hydraulic, and mechanical systems and servosystems in guns, gun mounts, gun turrets, rocket launchers, projectors, and associated handling equipment; test and inspect gun and rocket ammunition; test, inspect, and maintain magazine sprinkler systems; supervise personnel in the handling and stowage of gun and rocket ammunition; and direct crews in the operation of guns, gun mounts, gun turrets, rocket launchers, ammunition hoists and handling rooms, and projectors.

Gunner's Mate M (Missiles)

Duties: Gunner's Mates (M) operate, maintain, and repair guided-missile launching systems, missile launching groups, and associated handling equipment; make detailed electrical, electronic, hydraulic, and mechanical casualty analyses, maintain and repair electric, electronic, hydraulic, and mechanical systems and servosystems in missile launching systems, launching groups, and associated handling equipment; assemble and inspect missiles; prepare missiles for testing; replace defective components and modules; repair nonelectronic components of missiles; handle and stow missiles and missile components; test, inspect, and maintain magazine sprinkler systems; supervise personnel in the handling and stowage of missiles and missile components; and direct wing and fin assemblymen in the duties of their stations.

Gunner's Mate T (Technician)

Duties: Gunner's Mates (T) store, inspect, test, adjust, maintain, repair, and package nuclear weapon components and associated equipment; assemble, disassemble, and convert nuclear weapons, warheads, and/or components.

Aviation Ordnanceman

Duties: Aviation Ordnancemen inspect, maintain, and repair aircraft armament equipment and aviation ordnance equipment including aircraft guns, gun accessories, noncomputing gunsights, aerial towed target equipment, small arms, munitions handling equipment, and munitions suspension, release, launching, and arming equipment; store, maintain, assemble, load, and fuse aviation munitions; load nuclear weapons and aerial mines and torpedoes; load supplementary stores; assemble, test, load, and maintain air-launched guided missiles; operate small arms ranges; and supervises operation of aviation ordnance shops, armories, and aviation munitions storage facilities.

Aviation Antisubmarine Warfare Technician

Duties: Aviation Antisubmarine Warfare Technicians inspect and maintain aircraft antisubmarine warfare systems and equipment, including those related to magnetic anomaly detection, long- and short-range underwater detection, nuclei detection, integrated displays, and associated ASW equipment; and test and maintain test equipment.

Torpedoman's Mate

Duties: Torpedoman's Mates maintain, test, repair, and overhaul underwater ordnance, such as torpedoes and depth charges launched from naval vessels and aircraft; maintain and repair underwater ordnance launching equipment; supervise stowage of underwater ordnance, maintain torpedo test equipment; serve on surface craft and submarines, at aviation activities, and at repair shops; and prepare for launching, and launch and recover torpedoes.

Clerical Skills (8)

Yeoman

Duties: Yeomen perform clerical, administrative, and secretarial duties, including typing and filing; operate duplicating and audio-recording equipment; prepare and route correspondence and reports and maintain records, publications, and officer service records. Serve as reporters for courts-martial and fact-finding bodies. Personnel in higher paygrades act as office managers.

Communications Yeoman

Duties: Communications Yeomen perform clerical duties in communications stations and/or facilities, including shipboard communications offices; log, route, file, and maintain security of messages in accordance with existing regulations, instructions, and procedures included in pertinent publications;

act as registered publications clerk; maintain communications publications; operate and control radiotelephone and radioteletype equipment.

Personnelman

Duties: Personnelmen perform enlisted personnel administration duties involved in manpower utilization including such records, reports, and accounting procedures as may be required; maintain enlisted personnel service records; counsel enlisted personnel concerning Navy ratings, training, advancement, educational opportunities, and the rights and benefits and advantages of a Navy career; conduct tests and interviews regarding various personnel programs; utilize and maintain current publications and directives pertaining to enlisted personnel administration; conduct military manpower staffing, organization and occupational analysis studies; and perform clerical duties required in administration of enlisted personnel.

Boatswain's Mate (9)

Boatswain's Mates

Duties: Boatswain's Mates train, direct, and supervise personnel in military duties in all activities relating to marlinspike, deck, and boat seamanship, and in painting, maintenance, and upkeep of ship's external structure, rigging, deck equipment, and boats; take charge of working parties; perform seamanship tasks; act as petty officer in charge of picketboats, self-propelled barges, tugs, and other yard and district craft; maintain discipline as master at arms and police petty officers; serve in, or take charge of, guncrews or damage-control party; and operate and maintain equipment used in loading and unloading.

APPENDIX B

SOURCE AND CONTENT OF DATA

1. Army Source One - Master Status Card
2. Army Source Two - Enlisted Qualification Record (Army Form DA-20)
3. Navy Source One - Inactive Enlisted Reserve Tape Extract
4. Navy Source Two - Enlisted Classification Record (NAVPERS 601-3) and Navy Occupation and Training History (NAVPERS 601-4)
5. Army and Navy Source Three - Questionnaire of the Military Training Study

ARMY SOURCE 1 - MASTER STATUS CARD

Card Columns	Content
1-17	Name
18-27	Service Number
28-31	Grade and Grade Code
32-33	Branch (officers only)
34-36	Transaction Code
37-38	Date Entered Present Category
39	Security Clearance
40-41	Date Last P/E
42-46	PMOS
47-51	SMOS
52	Racial Group
53	Civilian Education Code
54	Marital and Dependency Status
55-56	ORGN (Class)
57-58	State Sequence Code
59-62	Processing Code
63-64	ETS (Blank-Off)
65	Military Schools (officers only)
66-68	Civilian Occupation (DOT code)
67	Critical
69-71	Date of Birth
72-73	Year Released from Active Duty
74	MOB AVAIL (SBY only)
75-76	Reason for transfer to SBY

Card Columns	Content
77-78	Months Prior Active FED SVC
79	Term of SVC Code
80	Active Duty Training Status

DA FORM 1 NOV 54 20
PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE

ENLISTED QUALIFICATION RECORD

(AR 640-203)

1. NAME (Last, first, middle initial) AND SERVICE NUMBER

2. GRADE	3. DATE OF BIRTH DAY / MONTH / YEAR	4. CITIZENSHIP	☐ NATIVE ☐ DERIVATIVE ☐ NATURALIZED (Year) CITIZEN OF	5. BIRTHPLACE	SELF FATHER MOTHER
6. MOS CODE	PRIMARY	DUTY			
7. MARITAL STATUS	8. DEPENDENTS	9. RACE			

10. ENLISTED OR INDUCTED					
COMPONENT	DATE DAY	MONTH	YEAR	LENGTH	EXPIRES
ORDERED INTO ACTIVE DUTY					

11. RESERVE STATUS	GRADE	BRANCH

12. RESIDENCE IN FOREIGN COUNTRY	
LAST YEAR	COUNTRY

13. PRIOR MILITARY EXPERIENCE					
HIGHEST DUTY ASSIGNMENT	CODE	MONTHS HELD	HIGHEST GRADE	SERVICE	YEAR

14. PHYSICAL STATUS								
P	U	L	H	E	S	SUFFIX	CODE	DATE
HEIGHT FT. IN.						WEIGHT LBS.		

15. ASSIGNMENT LIMITATIONS

16. AVOCATIONS AND SPORTS

17. CIVILIAN EDUCATION				
SCHOOL	MAJOR OR COURSE	DURATION	COMPLETED	YEAR
APPRENTICESHIP	☐ FORMAL ☐ INFORMAL			

18. MAIN CIVILIAN OCCUPATION	TITLE AND INDUSTRY	DOT CODE	MONTHS EMPLOYED
DUTIES PERFORMED			

19. SECOND BEST CIVILIAN OCCUPATION	TITLE AND INDUSTRY	DOT CODE	MONTHS EMPLOYED
DUTIES PERFORMED			

20. OTHER CIVILIAN WORK EXPERIENCE		
FROM	THROUGH	JOB TITLE

21. OCCUPATIONAL LICENSE OR CERTIFICATE HELD

22. LANGUAGES (Specify)	LIST COM PROF.	LIST COM SCORE	READ COM PROF.	READ COM SCORE	DATE
(1)					
(2)					
(3)					

23. APTITUDE TESTS						
FORM	SCORE	RETEST SCORE	AREAS APT.	AREAS OCC.	SCORE	RETEST SCORE
VE-			CO	1		
AR-						
PA-			EL	2-3		
MA-			CM	4-5		
ACS-			IM	6		
ARC-			CL	7		
SM-			GT	8-9-0		
AI-			RC	0		
ELI-			IN			
			AE			
DATE TESTED			DATE RETESTED			

24. OTHER TESTS			
TEST	SCORE	GROUP	DATE
CI			
GIT			

25. SECURITY CLEARANCE

26. MILITARY EDUCATION				
TITLE OF COURSE	MOS CODE	NAME OF SCHOOL	WEEKS	YEAR

27. SPECIALIZED TRAINING		
TYPE	WEEKS	COMPLETED

28. QUALIFICATION IN ARMS				
WEAPON	COURSE	QUAL.	SCORE	DATE

29. FOREIGN SERVICE						
FROM	THROUGH	TOTAL SERVICE YEARS	TOTAL SERVICE MONTHS	OVERSEA COMMAND	NTC

30. ENLISTED OR VOLUNTEERED FOR

31. TRAINING RECOMMENDED

32. CLASSIFICATION IN MILITARY OCCUPATIONAL SPECIALTIES		
TITLE	CODE	DATE

33.	RECORD OF ASSIGNMENTS					34. REMARKS
EFFECTIVE DATE	PRINCIPAL DUTY	MOS	GRADE	ORGANIZATION AND STATION	MONTHS HELD	

NAVY SOURCE 1 - INACTIVE ENLISTED RESERVE EXTRACT

Item	Tape Format
SERVICE NUMBER	001-007
SEX	008-008
NAME	009-039
RATE ABBREVIATION	040-044
PNEC	045-048
SNEC	049-052
DEPENDENCY CODE	053-054
PAY ENTRY BASE DATE (YR-MO-DAY)	055-060
RELEASE FROM ACTIVE DUTY DATE (YR-MO-DAY)	061-066
MILITARY OBLIGATION DESIG.	067-067
TOTAL ACTIVE DUTY (YRS-MO)	068-071
DATE OF BIRTH (YR-MO)	072-075
RACE CODE	076-076
SELECTIVE SERVICE NUMBER	077-087
STREET ADDRESS	088-117
CITY	118-135
STATE ABBREVIATION	136-139
ZIP CODE	140-144
SOCIAL SECURITY NUMBER	145-153
ADVANCED TECH TEST SCORES - READ	154-155
MATH	156-157
PHYS	158-159
ELEC	160-161
BASIC BATTERY TEST SCORES - GCT	162-163
ARI	164-165
MECH	166-167
CLER	168-169
SPECIAL TEST SCORES - SONAR	170-171
RADIO	172-173
ETST	174-175
YEARS EDUCATION CODE	176-176
APC #1	177-183
RECORD MARK	184-184

EXEMPT REPORT

B-6

ENLISTED CLASSIFICATION RECORD

LAST NAME (*First*) (*Middle*)	SERVICE NO.	RATE	CLASS	CO. NO.	D. O. T. OCCUP. CODE

YR. BIRTH	GCT	ARI	MECH	CLER	BTB FORM	SONAR	RADIO	ETST

SPECIAL TEST SCORES

NAME	FORM	DATE	SCORE

TEST SCORE PROFILE

	GCT	ARI	MECH	CLER
HIGH 1				
2				
AVER 3				
4				
LOW 5				

MOST SIGNIFICANT EDUCATION	DATES	YEARS EDUCATION	DEGREE	NAME OF COLLEGE OR UNIVERSITY

MAJOR COURSES

SPECIAL STUDIES	ALG.-GEOM.	TRIG.	PHYS.	TYPING	SHORTHAND
HIGH SCH.				WPM	WPM
COLLEGE				WPM	WPM

SPECIALIZED TRAINING (*Vocational, trade, technical, business*)

LEISURE TIME ACTIVITIES	SPORTS IN WHICH QUALIFIED
TALENT FOR PUBLIC ENTERTAINMENT	HIGHEST POSITION OF LEADERSHIP
MAIN CIVILIAN OCCUPATION (D. O. T. TITLE)	EMPLOYER'S NAME

LOCATION	YRS. SERVICE	WKLY. WAGE $	TRADE TEST NAME	SCORE

DUTIES, SKILLS, MACHINES

SECOND BEST OCCUPATION (D. O. T. TITLE)	EMPLOYER'S NAME

LOCATION	YRS. SERVICE	WKLY. WAGE $	TRADE TEST NAME	SCORE

DUTIES, SKILLS, MACHINES

OTHER WORK EXPERIENCE

RIGHT EYE		LEFT EYE						
UNCORR.	CORR.	UNCORR.	CORR.	RIGHT HANDED	LEFT HANDED	QUALIFIED SWIMMER CLASS	QUALIFIED FOR	NOT QUALIFIED FOR

CODED RECOMMENDATIONS	REMARKS
RECOMMENDED TO STRIKE FOR	

PREPARING ACTIVITY	I VOLUNTEER FOR	INITIALS
INTERVIEWEE'S SIGNATURE	VERIFIED:	DATE

NAVY OCCUPATION AND TRAINING HISTORY

**See Art. B-2305, BuPers Manual*

1. ADVANCEMENT, REDUCTION OR CHANGE IN RATING

RATE TO WHICH PERSON WILL BE ADVANCED, REDUCED OR CHANGED	PRACTICAL FACTORS		TRAINING COURSES COMPLETED			DATE ADVANCED, REDUCED OR CHANGED RATING	*OFFICER'S INITIALS
	DATE COMPLETED FOR ADVANCEMENT	*OFFICER'S INITIALS	DESCRIPTION OF COURSE OR NAVPERS NUMBER	DATE COMPLETED	*OFFICER'S INITIALS		

2. NAVY ENLISTED CLASSIFICATION RECORD

DATE	PRIMARY CODE	SECONDARY CODE	*OFFICER'S INITIALS

3. RECORD OF OTHER OFF-DUTY STUDY (*USAFI Courses, Etc.*)

DATE COMPLETED	NUMBER AND TITLE OF COURSE OR TEST	SCHOOL	GRADE	*OFFICER'S INITIALS

4. DESIGNATOR RECORD

DATE	DESIGNATOR	QUALIFICATION OR REVOCATION	*OFFICER'S INITIALS

5. GENERAL EDUCATIONAL DEVELOPMENT TESTING RECORD

	PASSED: (*In-service equivalent*)	FAILED: (*Void if passed on retest*)
HIGH SCHOOL LEVEL	HIGH SCHOOL GRADUATION ☐ *Date* ________ **Off.* ______ *Initials*	☐ *Date* ________ **Off.* ______ *Initials*
COLLEGE LEVEL	ONE YEAR COLLEGE ☐ *Date* ________ **Off.* ______ *Initials*	☐ *Date* ________ **Off.* ______ *Initials*

6. RECORD OF NAVY SERVICE SCHOOLS ATTENDED

NAME AND LOCATION OF SCHOOL		
CLASS NO.	COURSE LENGTH	DATE ENROLLED
DATE COMPLETED	FINAL MARK (0-100) (*62.5 passing*)	CLASS STANDING ______ *in a class of* ______
MANNER OF COMPLETION ☐ **GRADUATED** ☐ **DROPPED FOR** ____________		
SIGNATURE*		

NAME AND LOCATION OF SCHOOL		
CLASS NO.	COURSE LENGTH	DATE ENROLLED
DATE COMPLETED	FINAL MARK (0-100) (*62.5 passing*)	CLASS STANDING ______ *in a class of* ______
MANNER OF COMPLETION ☐ **GRADUATED** ☐ **DROPPED FOR** ____________		
SIGNATURE*		

NAME (*Last*)	(*First*)	(*Middle*)	SERVICE NUMBER	BRANCH AND CLASS

Navy Occupation and Training History **NAVPERS 601-4** (*Rev. 3-58*) 4 ☐

3-0286 VET
12066

MILITARY TRAINING STUDY

(1 - 4) (5-6)
01

This is Miss Clark of National Certified Interviews in Chicago. You recently received a letter from the Director of the Military Training Study saying that we would be calling to ask you some questions about your work and training experience since leaving the service . . .

1. Do you remember receiving this letter?

Yes. . Y
No . . N

IF YES

2. Fine. As you know, this information is needed to find out how the training and work done in the military is being used by servicemen after their discharge from the active service, on their civilian jobs. All of the information you give is entirely confidential, and your identity will never be revealed.

IF NO

3. This study is being carried out in cooperation with the Veteran's Administration, and other government agencies, in order to find out how the training and work done in the military is being used by servicemen after their discharge from the active service, on their civilian jobs. All of the information you give is entirely confidential, and your identity will never be revealed.

4. How many years have you been out of the active service? ________
(7-15)

5. What is your social security number? ___ __ ____

D.K. 8
Has None. 9

6. And what was your armed forces serial number when in active service?

(16)
US. . . 1

RA. . . 2
NG. . . 3
AF. . . 4
Other ___ 5
(SPECIFY)
D.K. 8

(17-24)
D.K. ________ 8

IF US PREFIX (DRAFTEES)

7. First, let's talk about when you entered the service. . .did you ask to have your name moved up on the call or wait to be drafted?

(25)
Moved up. . 1
Drafted . . 2-SKIP TO Q.10

IF MOVED UP

8. If you had not had a military obligation before you entered the service, how likely would it be that you would have enlisted. . . would you say that you definitely would have enlisted, probably would have enlisted, probably would not have enlisted, definitely would not have enlisted. . .or are you not sure what you would have done?

(26)
Definitely would. . . 1
Probably would. . . . 2
Probably would not. . 3
Definitely would not. 4

Not sure/Don't know . 5

SKIP TO Q.10

IF RA,NG,AF or OTHER (ENLISTEES)

9. First, let's talk about when you entered the service. . .if you had not had a military obligation before you entered the service, how likely would it be that you would have enlisted. . .would you say that you definitely would have enlisted, probably would have enlisted, probably would not have enlisted, or definitely would not have enlisted... or are you not sure what you would have done?

(27)
Definitely would. . . 1
Probably would. . . . 2
Probably would not. . 3
Definitely would not. 4

Not sure/Don't know . 5

10. At the time that you went into military service were you interested in being assigned to a particular job or training program or had you no particular preference as to the job in which you would be placed?

	(28)
Interested in particular field	1
No preference	2

IF INTERESTED IN PARTICULAR FIELD

11a. Did you notify the military - either in writing or verbally - about this interest?

	(29)
Yes	1
No.	2
D.K.	8

b. Did you receive any training in the area or job that you were interested in while you were in the active service?

	(30)
Yes	1
No.	2
D.K.	8

c. Did you serve in this area or job at any time while you were in the active service?

	(31)
Yes	1
No.	2
D.K.	8

12. Was your training or work in the active military something entirely new to you or was it similar to school, a hobby or work you had done before you went in service?

	(32)
New	1
Similar	2
D.K.	8

IF SIMILAR

13. What similar experience had you had before. . .a full-time job, part-time job, hobby, club activity, or what?

Job: Full-time. . . . . ☐
Part-time. . . . . ☐
Other__________________ ☐
(SPECIFY)

OFFICE USE

	(33)
FT.	1
PT.	2
O	3
FT + PT	4
+ O.	5
+ PT + O	6
PT + O.	7

Now, I'd like to talk to you about some of the jobs and schooling you've had since you got out of the active military . . .

14. After leaving the service was your first steady activity a job or school?

	(34)
School.	1
Job	2
Both job and school	3
Neither worked nor went to school.	4-GO TO Q.50a

IF SCHOOL OR BOTH IN Q.14

15. About how many weeks was it after you were separated before you actually started in a school or training program?

	(35-36)
# of Weeks	__ __
D.K.	6 1

SKIP TO Q.18

IF JOB IN Q.14

16. About how many weeks was it after you were separated before you began looking for a job?

	(37-38)
# of Weeks	__ __
Sought job while in service.	00
Returned to previous job/no need to look.	60
D.K.	61

17a. Since you were discharged from the active service have you attended any school or taken any correspondence courses?

	(39)
Yes.	1
No	2

IF NO

b. You have had no school training or courses since leaving the military, is that right?

Has had no schooling. NoS
Has had schooling . . Sch → CORRECT Q.17a & CONTINUE WITH Q.17c

IF YES, SCHOOL

c. Did this job you took right after getting out of the service have anything to do with your school plans, that is, getting money for school or using up time, or did the job have nothing to do with your plans for school?

	(40)
Getting money/using time.	1
Had nothing to do with school plans.	2
D.K.	8

IF ATTENDED SCHOOL/CORRESPONDENCE COURSES, CONTINUE WITH Q.18.

IF NO SCHOOL, SKIP TO Q.21

ASK QUESTIONS ON THIS PAGE IF SCHOOL IN Q.14 or Q.17a

OFFICE USE	(41)
FT.	1
PT.	2
CC.	3
FT + PT	4
+ CC	5
+ PT + CC.	6
PT + CC	7
D.K.	8

18. What type of schooling have you had since the service. . .was it full-time, part-time, or correspondence courses?

Full-time. . . . . ☐
Part-time. . . . . ☐
Correspondence courses . ☐

Let's talk about your (XXX). . .

(ASK Q.19 SERIES ABOUT EACH TYPE OF SCHOOLING: FULL-TIME, PART-TIME, CORRESPONDENCE.)

		FULL-TIME	PART-TIME	CORRESPONDENCE
19a. What kind of school was this. . .a high school, technical school, employer's training school, or what?		(42)	(51)	(60)
	High school	1	1	1
	Technical school:			
	Public	2	2	2
	Private	3	3	3
	Employer training school	4	4	4
	College	5	5	5
	Other________ (SPECIFY)	6	________ 6	________ 6
	D.K.	8	8	8
b. What was the primary purpose of this schooling. . .was it to finish school, to get additional training in your trade, go into a new field, or what?		(43)	(52)	(61)
	To finish school	1	1	1
	Get additional training in own trade	2	2	2
	Go into new field	3	3	3
	Other________ (SPECIFY)	4	________ 4	________ 4
	D.K.	8	8	8
c. How many months did you attend school?		(44-45)	(53-54)	(62-63)
	# Months	__ __	__ __	__ __
	D.K.	6 1	6 1	6 1
d. Are you currently attending?		(46)	(55)	(64)
	Yes	1	1	1
	No	2	2	2

ASK FOR FULL-TIME AND PART-TIME

20a. When you were going to school (full)(part) time, who paid for the major part of the educational costs like tuition, books and other school expenses. . .was it you or your wife, other relatives, your employer, a loan, a scholarship, or what?

(ALLOW ONE ANSWER ONLY. IF INSISTS ON MORE THAN ONE, CIRCLE CODE FOR FIRST MENTIONED)

	FULL-TIME (47-48)	PART-TIME (56-57)
Self/wife	01	01
Relative/friends	02	02
Employer	03	03
Loan: Gov't.	04	04
Private	05	05
Scholarship: Gov't	06	06
Private	07	07
Other________ (SPECIFY)	08	________ 08
D.K.	61	61

b. What was your major source of support for living expenses while you were in school . . . you or your wife, other relatives, a scholarship, or what?

(ALLOW ONE ANSWER ONLY.)

	FULL-TIME (49-50)	PART-TIME (58-59)
Self/wife	01	01
Relative/friends	02	02
Employer	03	03
Loan: Gov't.	04	04
Private	05	05
Scholarship: Gov't	06	06
Private	07	07
Other________ (SPECIFY)	08	________ 08
D.K.	[illegible]	[illegible]

Now let's talk about the first job you took when you got out of the service . . .

POST-DISCHARGE JOB TITLE

21. How did you hear about this job. . .did you answer an ad, hear about it through a friend or employment agency or what?

(65-66)
Answered ad. 01
Heard through family/friends 02
Private agency (fee involved). . . . 03
Federal or State employment service. 04
Referred by private organization/
lodge/legion post/church or union . 05
Applied on own 06
Returned to a former job 07
Other(SPECIFY)________________ 08
Through school 10
D.K. 61
No work experience since discharge . 62-SKIP TO Q.58a

22. Was it a full-time job, that is, working over 30 hours a week, or was it a part-time job?

(67)
Full-time. . 1
Part-time. . 2

23a. In what city and state was the job located?

____
(CITY) (STATE)

b. And what is the name of the county in which (CITY) is located?

____

OFFICE USE
(68)
SMSA . . . 1
NON-SMSA . 2
(69-71)
__ __ __
SMA

24a. Was this job located in the same area where you were living before you entered the service?

(72)
Yes . . 1
No. . . 2

IF NO

b. Would you say you moved because of this job or would you have moved anyway?

(73)
Because of job. 1
Moved anyway. . 2

25a. Did you work for someone or were you self-employed?

(74)
Worked for someone . 1
Self-employed. . . . 2

b. What was your job title when you first started the job?

c. Would you describe what you did on this job, that is, what your duties were, what equipment or machinery you handled?

d. What type of company was it, that is, what did they do or make?

OFFICE USE
Dot Code (75-80)
___ ___

PRESENT

31. How did you hear about this job. . .did you answer an ad, hear about it through a friend or employment agency or what?

Other(SPECIFY)
IF SAME COMPANY

32. Is it a full-time or a part-time job?

33a. In what city and state is the job located?

b. And what is the name of the county in which (CITY) is located?

____

34a. Did you change residence, that is, did you move prior to taking this job?

IF YES

b. Would you say that you moved because of the job or would you have moved anyway?

35a. Are you working for someone or are you self-employed?

b. What is your job title?

c. Would you describe what you do on this job, that is, what are your duties, what equipment or machinery do you handle?

d. What type of company is it, that is, what do they do or make?

CARD 2 (1-4)(5-6)
02

JOB TITLE

(7-8)
Answered ad 01
Heard through family/friends. 02
Private agency(fee involved). 03
Federal or state employment service 04
Referred by private organization/lodge/legion post/church or union. 05
Applied on own. 06
Returned to a former job. . . 07
______________________________ 08
AS POST-DIS. JOB, CIRCLE ⟶ 09
Through school. 10
D.K. 61

(9)
Full-time . . 1
Part-time . . 2

____
(CITY) (STATE)

OFFICE USE
(10)
SMSA . . . 1
NON-SMSA . 2
(11-13)
— — —
SMA

(14)
Yes . . 1
No. . . 2

(15)
Because of job. . 1
Moved anyway. . . 2

(16)
Working for someone . 1
Self-employed 2

OFFICE USE
Dot Code (17-22)
— — — — — —

PREVIOUS JOB TITLE

41. How did you hear about this job. . .did you answer an ad, hear about it through a friend or employment agency or what?

(23-24)
Answered ad 01
Heard through family/friends. 02
Private agency (fee involved) 03
Federal or State employment 04
Referred by private organization/lodge/legion post/church or union. . 05
Applied on own. 06
Returned to a former job. 07
Other(SPECIFY)______________________ 08
IF SAME COMPANY AS PRESENT JOB, CIRCLE ⟶ 09
Through school. 10
D.K. 61

42. Was it a full-time or a part-time job?

(25)
Full-time . . 1
Part-time . . 2

43a. In what city and state was the job located?

____
(CITY) (STATE)

b. And what is the name of the county in which (CITY) is located?

____

OFFICE USE
(26)
SMSA . . . 1
NON-SMSA . 2
(27-29)
— — —
SMA

44a. Did you change residence, that is, did you move prior to taking this job?

(30)
Yes . . 1
No. . . 2

IF YES
b. Would you say that you moved because of the job or would you have moved anyway?

(31)
Because of job. 1
Moved anyway. . 2

45a. Did you work for someone or were you self-employed?

(32)
Worked for someone . 1
Self-employed. . . . 2

b. What was your job title?

c. Would you describe what you did on this job, that is, what your duties were, what equipment or machinery you handled?

d. What type of company was it, that is, what did they do or make?

OFFICE USE
Dot Code (33-38)
— — — — — —

IF -F-EMPLOYED, ASK Q.27a,b;
SKIP TO Q.28

POST-DISCHARGE JOB TITLE

26a. Some companies have formal training programs which include lectures, demonstrations, or apprenticeships. . .were you given formal training in how to perform this particular job, or did you learn about it informally through another employee, or was there no training involved?

(39)

Formal	1
Informally . . .	2
No training. . .	3
D.K.	8

IF RETURNED TO FORMER JOB (Q.21-Code 07)

b. Did you receive this training before you went into the service or after you got out of the service?

(40)

Before	1
After.	2
Both	3
D.K.	8

IF SELF-EMPLOYED

27a. How similar was your [illegible] as a (JOB TITLE) to any training or experience that you had when you were in the service . . . would you say that it was very similar, somewhat similar, or not at all similar?

(41)

Very similar.	1
Somewhat similar. . .	2
Not at all similar. .	3
D.K.	8

b. How long were you a (JOB TITLE) whether for this company or any other company?

(42-43)

# of Months ___ ___
D.K 6 1

c. Did you ever put in any overtime while you were a (JOB TITLE)?

(44)

Yes . . .	1
No. . . .	2
D.K . . .	8

IF YES

d. Considering any hours over 40 as overtime, about how many hours of overtime did you average each week?

(45-46)

# Hours Per Week ___ ___
D.K. 6 1

IF SELF-EMPLOYED, ASK Q.37a,b;
KIP TO Q.38.

PRESENT JOB TITLE

36a. Were you given formal training in how to perform this particular job, or did you learn about it informally through another employee, or was there no training involved?

(47)

Formal	1
Informally . . .	2
No training. . .	3
D.K.	8

IF RETURNED TO FORMER JOB (Q.31-Code 07)

b. Did you receive this training before you went into the service or after you got out of the service?

(48)

Before	1
After.	2
Both	3
D.K.	8

IF SELF-EMPLOYED

37a. How similar is your work as a (JOB TITLE) to any training or experience that you had when you were in the service . . . would you say that it is very similar, somewhat similar, or not at all similar?

(49)

Very similar.	1
Somewhat similar. . .	2
Not at all similar. .	3
D.K.	8

b. How long have you been a (JOB TITLE) whether for this company or any other company?

(50-51)

# of Months ___ ___
D.K 6 1

c. Did you ever put in any overtime since you've been a (JOB TITLE)?

(52)

Yes . . .	1
No. . . .	2
D.K . . .	8

IF YES

d. Considering any hours over 40 as overtime, about how many hours of overtime do you average each week?

(53-54)

# Hours Per Week ___ ___
D.K. 6 1

IF SELF-EMPLOYED, ASK Q.47a,b;
SKIP TO Q.48.

PREVIOUS JOB TITLE

46a. Were you given formal training in how to perform this particular job, or did you learn about it informally through another employee, or was there no training involved?

(55)

Formal	1
Informally . . .	2
No training. . .	3
D.K.	8

IF RETURNED TO FORMER JOB (Q.41-Code 07)

b. Did you receive this training before you went into the service or after you got out of the service?

(56)

Before	1
After.	2
Both	3
D.K.	8

IF SELF-EMPLOYED

47a. How similar was your work as a (JOB TITLE) to any training or experience that you had when you were in the service . . . would you say that it was very similar, somewhat similar, or not at all similar?

(57)

Very similar.	1
Somewhat similar. . .	2
Not at all similar. .	3
D.K.	8

b. How long were you a (JOB TITLE) whether for this company or any other company?

(58-59)

# of Months ___ ___
D.K 6 1

c. Did you ever put in any overtime while you were a (JOB TITLE)?

(60)

Yes . . .	1
No. . . .	2
D.K . . .	8

IF YES

d. Considering any hours over 40 as overtime, about how many hours of overtime did you average each week?

(61-62)

# Hours Per Week ___ ___
D.K. 6 1

POST-DISCHARGE JOB TITLE

CARD 3 (1-4)(5-6)
03

28a. While you were a (JOB TITLE) did you, at any time, have any extra jobs?

	(7)
Yes. .	1
No . .	2
D.K. .	8

IF YES

b. How many extra jobs did you have in addition to your primary job?

	(8)
One. . . .	1
Two. . . .	2
3 or more.	3
D.K. . . .	8

Now let's talk about your first extra job. . .
(IF MORE THAN ONE JOB: ASK Q.29 SERIES ABOUT 1ST JOB, THEN 2ND, ETC.)

29a. Would you say that this extra job was very similar, somewhat similar, or not at all similar to your military training?

	1st (9)	2nd (20)	3rd (31)
Very similar. . . .	1	1	1
Somewhat.	2	2	2
Not at all.	3	3	3
D.K.	8	8	8

b. About how many hours did you work on this extra job each week?

	(10-11)	(21-22)	(32-33)
# Hours Per Week	_ _	_ _	_ _
D.K.	6 1	6 1	6 1

c. What was the hourly rate of pay?

	(12-15)	(23-26)	(34-37)
	$_ _._ _	$_ _._ _	$_ _._ _
Refused . . .	7	7	7
D.K. . . .	8	8	8

d. While you were on this extra job, what was the hourly rate of pay for your primary job?

	(16-19)	(27-30)	(38-41)
	$_ _._ _	$_ _._ _	$_ _._ _
Refused . . .	7	7	7
D.K. . . .	8	8	8

PRESENT

38a. Since you've been a (JOB TITLE) did you, at any time, have any extra jobs?

IF YES

b. How many extra jobs have you had in addition to your primary job?

Now let's talk about your
(IF MORE THAN ONE JOB: ASK
1ST JOB, THEN 2ND, ETC.)

39a. Would you say that this extra job was very similar, somewhat similar, or not at all similar to your military training?

b. About how many hours did you work on this extra job each week?

c. What was the hourly rate of pay?

d. While you were on this extra job, what was the hourly rate of pay for your primary job?

Now let's talk about the other job titles you have had since this first job title you had when you got out of service . . .

30a. How many other different jobs, that is, jobs where your title and duties were completely different from this job we've just been talking about, have you had between then and the present time?

IF CURRENTLY UNEMPLOYED X HERE ☐ AND ASK ABOUT MOST RECENT JOB HELD.

(42)
5 others. 5
4 others. 4
3 others. 3
2 others. 2

b. Now let's talk about your present job title. . .are you with the same company as you were on the job we were just talking about or with a different company?

		(43)
CODE Q.31/ASK Q.32 ←	Same Co. . . .	1
ASK Q.31 ←	Different Co .	2

1 other . 1

c. Then this one other job title must also be your present job title, is that correct?

Yes. . 3
No(EXPLAIN)

d. Are you with the same company as you were on the job we were just talking about or with a different company?

CODE Q.31/ASK Q.32 ←	Same Co. . . .	1
ASK Q.31 ←	Different Co .	2

None. . . 6

e. You're doing the same work now, is that right?

No(EXPLAIN) SKIP TO Q.50a ← Yes. . 3

IF 5,4,3,2 IN Q.30a

40. Now let's talk about the job title you had just before this present one. . . were you with the same company or a different company?

		(79)
CODE Q.41/ASK Q.42 ←	Same Co. . .	1
ASK Q.41 ←	Different Co.	2

IF 1 IN Q.30a

CONTINUE WITH Q.50

JOB TITLE

	(44)
Yes. . .	1
No . . .	2
D.K. . .	8
	(45)
One. . . .	1
Two. . . .	2
3 or more.	3
D.K. . . .	8

first extra job. . .
Q.39 SERIES ABOUT

	1st (46)	2nd (57)	3rd (68)
Very similar . .	1	1	1
Somewhat	2	2	2
Not at all . . .	3	3	3
D.K.	8	8	8
	(47-48)	(58-59)	(69-70)
# Hours Per Week	__ __	__ __	__ __
D.K.	6 1	6 1	6 1
	(49-52)	(60-63)	(71-74)
	$__ __.__ __	$__ __.__ __	$__ __.__ __
Refused	7	7	7
D.K.	8	8	8
	(53-56)	(64-67)	(75-78)
	$__ __.__ __	$__ __.__ __	$__ __.__ __
Refused	7	7	7
D.K.	8	8	8

(80)

PREVIOUS JOB TITLE

CARD 4 (1-4)(5-6)
04

48a. While you were a (JOB TITLE) did you, at any time, have any extra jobs?

	(7)
Yes. .	1
No . .	2
D.K. .	8

IF YES

b. How many extra jobs did you have in addition to your primary job?

	(8)
One. . . .	1
Two. . . .	2
3 or more.	3
D.K. . . .	8

Now let's talk about your first extra job. . .
(IF MORE THAN ONE JOB: ASK 49 SERIES ABOUT 1ST JOB, THEN 2ND, ETC.)

49a. Would you say that this extra job was very similar, somewhat similar, or not at all similar to your military training?

	1st (9)	2nd (20)	3rd (31)
Very similar. . . .	1	1	1
Somewhat.	2	2	2
Not at all.	3	3	3
D.K.	8	8	8
b. About how many hours did you work on this extra job each week?	(10-11)	(21-22)	(32-33)
# Hours Per Week	__ __	__ __	__ __
D.K.	6 1	6 1	6 1
c. What was the hourly rate of pay?	(12-15)	(23-26)	(34-37)
	$__ __.__ __	$__ __.__ __	$__ __.__ __
Refused . . .	7	7	7
D.K. . . .	8	8	8
d. While you were on this extra job, what was the hourly rate of pay for your primary job?	(16-19)	(27-30)	(38-41)
	$__ __.__ __	$__ __.__ __	$__ __.__ __
Refused . . .	7	7	7
D.K. . . .	8	8	8

CONTINUE WITH Q.50

50a. Ten years from now, do you think you'll be doing the same type of work (as you are doing)(as you were last doing) or do you think you'll be doing an entirely different type of work?

	(42)
Same type of work. . . .	1
Different type of work .	2
D.K.	8

IF DIFFERENT

b. What type of work do you think you might be doing?

	(43)
Same type of work, different level. .	1
Different type of work.	2
D.K.	8

51. We've talked about the (various) job(s) you've held. . . now thinking over the times you have been looking for work since being out of the service, have you ever looked for a job that was similar to the training or work you did while you were in the military?

Looked:	(44)
similar. . .	1
not similar.	2
Have not looked . .	3
D.K.	8

IF LOOKED: SIMILAR (Q.51 - Code 1)

52. Did you find such a job?

	(45)
Yes. . .	1
No . . .	2

IF YES TO Q.52

53. Did you take the job?

	(46)
Yes. . .	1
No . . .	2

IF YES TO Q.53

54. When you interviewed for the job, do you think that your military training and experience helped you in any way to get a better job **title or a higher starting salary**, or do you think that the title or starting salary would have been the same even if you had not had this military training?

	(47)
Helped get better job title.	1
Helped get better starting salary. .	2
No help or difference.	3
D.K.	8

IF NO TO Q.53

55. Why not?

	(48-49)	(50-51)
Low pay/better pay in different job.	01	01
More security in different job.	02	02
More fringe benefits in different job.	03	03
Chances for further training and learning skills in different job. .	04	04
Dead end/more chance for advancement in different job.	05	05
Irregularity of hours . . .	06	06
Did not like the job itself	07	07
Other(SPECIFY BELOW). . . .	08	08
D.K.	61	61

IF LOOKED: NOT SIMILAR (Q.51 - Code 2)

56. You haven't looked for any work that was in any way like the training you had in the service or the work you did in the service, is that right?

Haven't looked for any. NotS
Have looked for similar work. . . . Sim →

CORRECT Q.51 & CONTINUE WITH Q.52

57. Why not?

	(52-53)	(54-55)
Low pay/better pay in different job.	01	01
More security in different job.	02	02
More fringe benefits in different job	03	03
Chances for further training and learning skills in different job.	04	04
Dead end/more chance for advancement in different job.	05	05
Irregularity of hours . .	06	06
No similar civilian job .	07	07
No job vacancies.	08	08
No jobs of that type available in geographic area.	09	09
Did not like the job itself	10	10
Other(SPECIFY BELOW). . .	11	11
D.K.	61	61

58a. Thinking back to the training and work you did while in the military . . . have you ever tried to get additional training similar to it since you've been out of the service?

	(56)
Yes. . .	1
No . . .	2
D.K. . .	8

IF NO

b. Why, what were the reasons?

	(57-58)	(59-60)
Had all the training needed. .	01 . .	01
There were no facilities for training in area.	02 . .	02
Couldn't afford cost	03 . .	03
Had no interest in the occupation because:		
low pay. . . .	04 . .	04
dead end . . .	05 . .	05
no security. .	06 . .	06
Did not like the job itself. .	07 . .	07
Couldn't afford the time . . .	08 . .	08
Other(SPECIFY BELOW)	09 . .	09
D.K.	61 . .	61

(61-80)

CARD 5 (1-4) (5-6)
05

59a. As you know, it is every citizen's right to collect unemployment compensation. However, they sometimes neglect to do so. Have there been any times since you have been out of the active service when you could have collected unemployment compensation but did not?

	(7)
Yes. . .	1
No . . .	2
D.K. . .	8

IF YES

b. How many times?

	(8)
One time	1
Two times. . . .	2
Three times. . .	3
Four times . . .	4
D.K.	8

c. How long a period was this (1st, 2nd, 3rd, 4th) time when you could have collected but did not? (ENTER IN # OF WEEKS)

(9-10)
First time __ __
D.K. . . . 0 0
(11-12)
Second time__ __
D.K. . . . 0 0
(13-14)
Third time __ __
D.K. . . . 0 0
(15-16)
Fourth time__ __
D.K. . . . 0 0

60a. Have there been any times since you have been out of the active service when you did collect unemployment compensation?

	(17)
Yes. . .	1
No . . .	2
D.K. . .	8

IF YES

b. How many times?

	(18)
One time	1
Two times. . . .	2
Three times. . .	3
Four times . . .	4
D.K.	8

c. How long a period was this when you collected (1st, 2nd, 3rd, 4th) time? (ENTER IN # OF WEEKS)

(19-20)
First time __ __
D.K. . . . 0 0
(21-22)
Second time__ __
D.K. . . . 0 0
(23-24)
Third time __ __
D.K. . . . 0 0
(25-26)
Fourth time__ __
D.K. . . . 0 0

There are just a few additional questions about your wages and other income since you were discharged from the active service . . . all of this information is used for statistical purposes only. First, let's go back to the first 12 months after you were discharged . . .

61a. During the 12 months after you were discharged, did you have any income from such sources as the government like VA, or dividends, interest, royalties, or from renting property?

	(27)
Yes . . .	1
No. . . .	2
Refused .	7
D.K. . .	8

IF YES

b. For the first 12 months after your discharge what was your total income from these other sources?

(28-32)
$_ _,_ _ _
Refused 7
D.K. 8

62. For the first 12 months after you were discharged how many weeks did you work, including weeks of paid vacation?

(33-34)
# of Weeks __ __
D.K. 6 1

63. And for these same 12 months, what was your average weekly salary before taxes for the work that you did, not including any overtime pay that you may have received? (ROUND TO NEAREST $)

(35-37)
Weekly: $_ _ _
Refused . . 7
D.K. . . 8

64. Then, for the entire 12 month period, what was your total income before taxes (including the income from the other sources which you mentioned) but not including the income of other members of your family? (ROUND TO NEAREST $)

(38-42)
$_ _,_ _ _
Refused 7
D.K. 8

Fine, now let's talk about the 12 month period from January 1st, 1965 to December 31st, 1965 . . .

65a. Did you have income from such sources as the government like VA, or dividends, interest, royalties or from renting property?

(43)
Yes. . . 1
No . . . 2
D.K. . . 8

IF YES

b. Then, from January through December of 1965, what was your total income from these other sources?

(44-48)
$_ _,_ _ _
Refused 7
D.K. 8

66. From January through December of 1965, how many weeks did you work, including weeks of paid vacation?

(49-50)
# of Weeks __ __
D.K. 6 1

67. And, for this same period, what was your average weekly salary before taxes for the work that you did, not including any overtime pay you may have received? (ROUND TO NEAREST $)

(51-53)
$_ _ _
Refused . . 7
D.K. . . 8

68. Then, from January 1st to December 31st, 1965 what was your total annual income before taxes (including the income from the other sources which you mentioned) but not including the income of other members of your family? (ROUND TO NEAREST $)

(54-58)
$_ _,_ _ _
Refused 7
D.K. 8

69. How about 1964, what was your total annual income before taxes that year?

(59-63)
$_ _,_ _ _
Refused 7
D.K. 8

70. Are you presently a member of a trade union?

(64)
Yes. . . 1
No . . . 2

71a. Just one more question . . . thinking back to when you were 15 years old, was the head of your household male or female?

(65)
Male 1
Female 2
No household head. . 3
D.K. 8

IF FEMALE

b. Was there anyone over the years living in the home, like a brother or other male relative, who contributed to the family income?

Yes. . Y
No . . N

IF YES, CORRECT Q.71a

IF MALE HEAD/CONTRIBUTED INCOME

c. What was his occupation?

____

OFFICE USE
Dot Code (66-71)
_ _ _ _ _ _

(72-80)

Thank you very much. As you know, the purpose of this study is to help improve the military training programs. We may write to you about getting some information in your social security record. We very much appreciate your help on this study. Of course, your identity will never be revealed. Thank you again for your cooperation.

Ref. #____________ Date__________ Int. Empl. #______

Appendix C

SAMPLE DESIGN AND SURVEY TECHNIQUES

Prepared by

William B. Clatanoff, Jr.
Research Assistant
Military Training Study

Appendix C

SAMPLE DESIGN AND SURVEY TECHNIQUES

The universe of the Military Training Study is highly restrictive. In Chapter III the criteria of service, occupational specialty, and reserve status were discussed. These, along with age, rank, time in service, and locatability, defined the population. The steps were then drawing, locating, and interviewing the sample as well as processing data from military records.

Sample Specification

The additional criteria, for reasons which are explained, are as follows:

1) The population served between 2 and 5 years in active duty. Personnel with less than 2 years active duty were eliminated because they include the "six month" and other short-term reservists who were excluded because the military neither disrupted their life nor significantly invested in a skill. Men with less than 2 years active duty in general do not receive the more advanced training and on-the-job training that would give a transferable military skill.

Persons with more than 5 years active duty were eliminated to restrict the study to the vast majority of the services' throughput. In this period initial enlistment duration ranged from 2 years for Army draftees to 4 years for Navy enlistees.

In no cases did it exceed five years, including extended enlistment contracts required for various specific military assignments. Therefore, men with more than 5 years active duty would have had to "re-up" at some point during their career. These careerists do not represent the majority of military veterans. Rather, the military is an experience that breaks civilian occupational patterns and/or an educational and training experience useful in a post-service life. Military careerists are excluded by design.

2) The enlisted man should have been released from active duty between 1 January 1960 and 31 July 1965. This period between time of release from service and the interview is long enough to exhibit occupational crossover, as well as allow for post-service education or training. It should indicate future job and training characteristics of the sample.

This is a sufficient interval of time to allow a clearly revealed preference for occupational fields. It has been noted that the stability of occupational choice increases with age and with time spent in a particular occupation. This is the "cannonball principle" of job and vocational choice: i.e. career inertia as time progresses.[1]

The justification to limit the sample to post-1960 veterans was that increasing the time out of service would, on a priori grounds, reduce the chance of interviewing the sample. Behind this is the Census data on mobility by veterans. The longer the time span between the military's address of record and the date of attempted contact, the greater the probability that the address of record would be invalid. Although one or more subsequent moves in the post-service period did not preclude contact, this increased the effort and time as well as cost of making the initial contact.

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[1] John Holland, "Psychology of Occupational Choice," Journal of Human Resources, Volume II, No. 2, Spring 1967, p. 176.

3) Our population was born after 1935. This age restriction applied to the vast majority of non-career military personnel released during the covered period. Secondly, men born prior to 1935 would appear to be a less homogeneous, non-representative subset of the sample. The aged draftee or volunteer would have a set of attributes that require separate analysis. The mean year of birth of the sample was 1942.

4) Personnel with, in military terminology, "address status codes 1 through 8" were eliminated. The address of record is the address given by the person at the time he exited active duty. A move after his exit from active duty while in reserve status should change this. These particular codes indicated the veteran would be "unavailable" for contact. They include either no fixed address, an out of the country address, penal institution, hospital, or veterans who have returned to military service.

5) Personnel in pay grades E-1 and E-2 at time of service exit were eliminated. Personnel in these pay grades were taken to be non-representative of the exiting military population. Pay grade E-1 is assigned to the recruit or trainee, and is usually held only during basic training. Grade E-2 is held shortly thereafter for an indefinite period of time. However, failure to attain the status of E-3 or above indicated that the person in question had not made satisfactory progress within his chosen military occupational career. Our concern with the problems of occupational crossover suggested that people to whom the military ascribed low proficiency within a military occupation should not be represented. These are very few and would muddy the sample. These lower pay grades do not, in general, represent a meaningful quantity of specific capital and there should be no transfer effect.

6) Personnel in military medical and dental occupational specialties were eliminated. This was done first because of the structure of the skills within the service. In the Navy, for example, they are administered not by the Bureau of Personnel (BUPERS), but rather by the Bureau of Medicine (BUMED). Data acquisition on this group would therefore be difficult, requiring more time and expense by using different sources. Second, the civilian occupational structures within

these careers were seen to be dissimilar to more general civilian occupational structures. This original judgment, done in concert with the military, was probably in error. Another study is seeking to rectify this mistake.

Sample Selection

1) Cell size. The Army sample was grouped into 10 MOS groupings and the Navy sample into 9 NEC groupings. It thus became of paramount importance to insure that within each of these 19 disaggregated cells, we had sufficient observations to insure statistical validity for any comparisons which would be made. As a result, the numbers of each of our cells is not in direct proportion to the size of these categories within the occupational structure of the military. For example, in the Navy there are approximately five times as many Machinists Mates (MM's) as there are Interior Communications Specialists (IC's). However, our target cell sizes for these groups are approximately equal.

It can thus be seen that our sample should not be viewed as a true "cohort analysis" or random sample of military veterans. Rather, by sample design the distinguishing characteristics of each occupational group are of sufficient import to determine the numerical representation of the various career fields. The target of adequate cell size thus dictated the method of selection.

2) Random selection. Once the occupational categories were specified and the target cell size noted, it became necessary to draw our sample from the appropriate population. We were given by the Department of the Army approximately 40,000 "status cards," one for each veteran meeting the above-mentioned specifications. They were put on magnetic tape by the Military Training Study and arranged in random order. The appropriate number in each MOS was counted, the MOS's were aggregated into occupational groups, and total population size noted. We then randomly selected that percentage of each occupational population necessary to give us the desired cell size after allowing for sample attrition due to assumed error and nonlocatability.

This same technique was followed with the Navy, the only exception being that the initial population came not on tabulating cards, but rather on the Navy Enlisted Reserve Master Tape, which housed the appropriate population. A random number generator was then employed to select the initial sample for both the Army and the Navy.

3) Data description. The data at the disposal of the Military Training Study included the Army Status Cards for the Army population, and the Navy Enlisted Master Tape extract for the Navy. To properly analyze the problem we supplemented this information and the interview with data on each individual's pre-service as well as in-service characteristics.

For the Army this included the DA-20 form, while for the Navy similar information was included on two separate pages of the Enlisted Personnel File: The Naval Occupation and Training History (NAVPERS 601-4) and the Navy Enlisted Classification Record (NAVPERS 601-3). These are shown in Appendix B.

These provided, for each individual, information of critical importance: pre-service DOT codes, in-service training courses, correspondence courses, and rate advancements. An undesirable, but unavoidable, by-product of this was an increased sample attrition. For some individuals in both the Army and the Navy samples, we were able to complete the interview but were unable to obtain the DA-20 or NAVPERS 601-3 and 601-4.

Choice of Instrument

A prime consideration in any attempt to locate a dispersed sample, as was ours, is that as large a percentage in the sample as possible be contacted. Knowing that some attrition is inevitable, no biases should be introduced by the very nature of the contacting method or survey technique. Realizing this, careful consideration was given to the effect of a telephone interview as opposed to a directed face-to-face interview with the veteran.

According to Bell System spokesmen, the number of "residence units" with a telephone was 87% in 1966. This number moved up somewhat slowly from 85% in 1965 and 83% in 1964. This definition of "residence unit" excludes cases where the family telephone is in the hallway of a multi-unit dwelling, or persons living in or above business establishments when the primary telephone is a business listing. It is therefore estimated that approximately 95% of all dwelling units in America are open to contact via telephone. This suggested to the Military Training Study that attrition would not be significantly increased by use of a telephone versus the face-to-face technique. The selectivity of the military and age of the respondents were factors which suggested that these people were likely to have telephone service. The additional consideration of cost gave added weight to the use of the telephone interview method.

Of perhaps greater interest than individuals without telephones are those with unlisted telephone numbers. The procedure followed by the Military Training Study was determining the area code, calling the long distance information operator and asking for the number. This gave the Study better results than would have been obtained via the use of telephone directories or city telephone books, an experiment performed both for accuracy and internal cost. In the United States the Bell System maintains two classifications. The first are called "non-list." These are numbers which do not appear in directories but may be obtained from the operator. A subset of the non-lists are the "non-pubs," numbers which are neither listed in the directory nor available from the operators. As a national average, 9% of all main telephones are non-pubs. It is these phones which were unavailable to the Military Training Study and whose subscribers were unavailable for telephone contact.

The 9% figure may be somewhat misleading, however, because the variance around this average is considerable. It is known by the Bell System that the percentage of non-pubs is highest in large cities and almost negligible in rural areas. No exact figures are available for the individual metropolitan areas, but an estimate of this variance can be ascertained from an analysis of the percentage of non-pubs among components of the Bell System. At one extreme is Northwestern Bell, with few major cities, and only 1% non-pubs. California Bell, at the other extreme, has 15% non-pubs. The net effect of this variance is a clustering of our attrition within large cities.

In conversation with representatives of the Bell System, we attempted to ascertain characteristics of the non-pub. Several noteworthy attributes emerged. First, the number and absolute percentage of non-pubs are on the rise. This is primarily due to the increase of telephone salesmanship, most prevalent in larger cities. Also of significance here was the recent notoriety given to "obscene calls."

As far as variables which may bias our results, the Bell spokesman felt that people with unlisted and unpublished numbers are probably no different economically than the normal telephone user. Some may suspect a tendency for the non-pubs to be of above average incomes, but this is balanced by the debtors who have taken the non-pub route to avoid the bill collectors.

Data Acquisition

The starting point in the attempt to interview the sample was the address of record for each individual. In some cases this was the address given at the time of exit from active duty. For most veterans it was correct as of his exit from active reserve status.

The area code for the address of record was obtained for each individual from the Area Code Directory. Long distance telephone information was then called and the operator was asked for a listing under the full name of our individual. At this point, several alternatives were possible:

Case 1 - The Operator was able to give us the telephone number for this name. We asked if the address on our card agreed with the address which she had listed and she said yes. This was coded A-1.

Case 2 - The Operator was able to give us a number for the last name only at the address listed on the card. The first name was different. We asked her if she had a listing for the full name at some other address and she said no. This was coded B-1 and the different first name was noted.

Case 3 - The Operator was able to give us a number for the last name only at the address listed on the card. The first name was different. When asked if she had a listing for the full name at some other address, she said yes. The phone number at our address was coded B-1 as above. The phone number and different address of our full name were also taken and coded B-2.

Case 4 - The Operator had no listing for the last name at address of record. However, she did have listing(s) for the full name at different address(es). This information - area code, phone number, and address - was noted and coded C-1.

Case 5 - The Operator had a listing for full name at address listed on card, but it was a non-pub number. These were given the code U.

Case 6 - None of the above. The operator was unable to give a listing. These were coded F.

All of the attempts to obtain correct telephone numbers and addresses were initiated from College Park. The staff which performed the task was composed of University of Maryland undergraduates, mainly through the auspices of the College Work-Study program. They were all trained in the telephoning procedure, and kept under supervision with random checks on their results. The intelligence and diplomacy of this undergraduate staff in their contacts with the operators undoubtedly gave us better results than could have been obtained using low-grade outside help.

For those individuals whose information was coded A through C the phone number and address thus obtained were forwarded to National Certified Interviewers, Inc. in Chicago for the telephone interview. At the same time, a letter was sent to each veteran informing them that the Military Training Study would shortly be in contact with them via the telephone. A copy of this letter is included. The U's and F's were held pending the return from National Certified Interviewers of the results of their telephoning. For those veterans actually contacted, whether the interview was completed, terminated incomplete, or refused, no further action was taken by the Military Training Study. For the F's, U's and those for whom our information obtained from the telephone operator proved incorrect (primarily B's and C's) further action was taken to locate them and thus reduce the sample attrition. Specifically, this included the active cooperation of Lt. General Lewis B. Hershey and the staff of the Selective Service System, most notably that of the Research and Statistics Division, headed by Dr. Kenneth H. McGill.

The Selective Service Law requires that each male of draftable age, regardless of classification or his veteran status, keep his local board informed of his current address. Although many of the addresses obtained from the Army status

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UNIVERSITY OF MARYLAND
COLLEGE PARK 20742

MILITARY TRAINING STUDY
DEPARTMENT OF ECONOMICS

Dr. Paul A. Weinstein
Military Training Study - Dept. of Economics
University of Maryland
College Park, Maryland

Dear Dr. Weinstein:

I am studying the impact of training and work experience in the military on the jobs and training of veterans. Your name was chosen by chance and is one of thousands taking part in this study. Many groups have joined in this because they hope that we can improve the benefits of military training and help young men in their careers. The Ford Foundation and many departments of the government, such as the Labor Department, Health, Education and Welfare, and the Department of Defense have assisted me in this project.

I hope you, too, will help. In a few days a woman from National Certified Interviews, Inc. of Chicago will call and ask you some questions. We hope you will answer them. It will not take much time and will be very important to us. The first thing she will ask for will be your Social Security and Armed Forces Serial Numbers (AFSN).

All information derived from this study will be treated in a confidential manner. The material will be used for statistical purposes only and will not be associated with you in any way. Only you can help us in this study and aid future servicemen while they are in the service and after they are separated from the service.

Many thanks for helping when you are called.

Sincerely yours,

Paul A. Weinstein

Paul A. Weinstein
Director

cards or Navy Tape Extract were not necessarily the addresses of the individuals in our sample at the time of his 18th birthday (date of Selective Service registration), we nevertheless were able to ascertain the appropriate local board. This is possible from the first two digits of the individual's Selective Service number, which are a state code. The next two or three digits identify the local board, the last four digits alone being unique to the individual.

It was therefore possible to forward the F's, U's, and returns from National Certified Interviewers to the appropriate state Selective Service System. They, in turn, contacted the individual's local board who gave the Military Training Study the last recorded address, and in many instances telephone number, for the individual.

The Selective Service check on individuals was by no means perfect. In many cases they were unable to update the address which we had. They were of great assistance, however, in locating individuals who had completed interstate moves, thus changing the Area Code which we had originally obtained.

The addresses which were obtained in this fashion were then submitted to the same procedure outlined above. The net result was a greatly reduced sample attrition.

Perfect response was, of course, still not possible. The non-locatables, either from incorrect addresses or failure to complete contact once given the phone number, formed a sizable subset of our sample. An analysis of this subset vis-a-vis the completed sample was necessary to assure sample validity and to test the null hypothesis that the technique itself introduced bias into our results. This analysis is given in Appendix D.

Coding of Data

It was necessary for the Military Training Study to reduce the information contained on the DA-20 and NAVPERS 601-3 and 601-4 forms to a format appropriate for computer analysis. In addition, information on occupations as well as geographic location for each veteran ascertained from the questionnaire required coding for analysis. This coding was done at the University of Maryland, primarily by undergraduate assistants.

The military records were transferred to optical scanning sheets designed by the Military Training Study for that specific purpose. To reduce error, all work was double-checked prior to optical scanning. The original records were maintained until after the data had been transformed into punch cards, put on tape, and the individual records printed out so that any clerical errors could be corrected. The individual handling of each veteran's record also allowed us to "correct" these records for logical consistency. For example, in a substantial number of cases the actual forms were amended or "corrected" copies, the amendment often being a change in the (for example) level of schooling completed to reflect in- or post-service education. Our coding process allowed us to note this and so accurately determine pre-service education. In a similar vein, many of the DA-20 forms had no entry for Duty MOS. This information was easily coded, however, from the chronological listing of MOS assignments on the reverse of the form.

In addition to the coding of the military records, certain coding was necessary on the completed questionnaires after they were sent to the Military Training Study from National Certified Interviewers. For each of three possible jobs on each questionnaire the respondent was asked in which city, state, and county that job was located. Using the 1962 County and City Data Book[2] it was possible to ascertain whether or not the job was located within a Standard Metropolitan Statistical Area, and if so, which SMSA. It was later decided to code each entry for its specific county and state in order to facilitate an analysis by region using more explicit variables available on the County-City Data Tape.

Occupational analysis of each veteran's post-service jobs was initially planned as an enlightening aspect of this study. It was also desirable to correlate pre- and post-service vocations of the sample. Since both the Army DA-20 and Navy 601-3 code pre-service jobs under the Dictionary of Occupational Titles system, we opted to code each job response on the questionnaire with the appropriate D.O.T.[3] code.

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[2] U.S. Bureau of the Census, County and City Data Book (A Statistical Abstract Supplement). U.S Government Printing Office. Washington, D.C. 1962.

Arrangements were made with the U.S. Bureau of Employment Security for the coding of the Army sample. After the questionnaires were received from National Certified Interviewers, they were numbered, checked for completeness and consistency, and then delivered to B.E.S. for D.O.T. coding by their employees in their spare time. Each questionnaire contained from one to four different job descriptions and titles which required a code. The questionnaires were sent to B.E.S. in groups of fifty, and the time required for their return varied from two and one-half to four weeks.

Because of the time delay and the high per unit cost of obtaining the D.O.T. codes via this procedure, consideration was given to having the Navy sample coded by our own personnel. The first fifty Navy questionnaires were analyzed by us and a list made of the D.O.T. codes. These questionnaires were then sent to B.E.S. via the normal procedure.

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[3] U.S. Department of Labor, Dictionary of Occupational Titles, Third Edition, U.S. Government Printing Office. Washington, D.C., 1965.

Of the 102 D.O.T. codes on the questionnaires, 41 coincided exactly and 35 were extremely close - i.e. the first three digits were identical and the overall codes impossible to evaluate. B.E.S. was considered better on ten of the remaining 26 while our internal coding gave clearly superior codes in 16 cases.

Three factors emerged of a qualitative nature from the system used by B.E.S. First, there was a definite lack of specificity in the codes used for unskilled and semi-skilled laborers. For the vast majority of such cases (even those which we judged "close"), the B.E.S. codes were drawn from those numbers listed under the "Not Elsewhere Classified" categories with no regard to a specific industry or job function. Secondly, in five instances, B.E.S. listed D.O.T. codes not contained in the latest edition of Occupational Classifications. Whether this resulted from haphazard work from those involved or from the use of an outdated book could not be ascertained. Finally, in six instances B.E.S. classified "assistants" or "aides" in the 000 or 100 occupational categories when these men did not have the requisite education, skill level, or responsibilities to be included in the "professional, technical, and managerial occupations." We realized that prerequisites could be violated, but this caused some suspicion.

In addition to the quality of the actual coding, there appeared to be logistical advantages to internal coding. First and foremost, B.E.S. showed the tendency to delay the processing of the questionnaires for considerable time periods. The fifty questionnaires used in the test were at B.E.S. for three weeks. Even during the learning period when our workers were totally unfamiliar with the D.O.T. system, such a rate of work was far below par. As a result of this experiment, all D.O.T. coding for the Navy sample was done by our own personnel. The time and cost savings of this procedure were substantial.

Despite the effort involved in the occupational coding of our sample, little use was made of the information in our analysis. It is apparent to us that current systems by which tasks are aggregated (or separated) into "occupations" are of little value and rare applicability to economic analysis. Two criteria of any given occupation concern us: First, the elasticity of substitution between occupations and/or occupational categories. Second, a scalar or implicit variable which reflects the investment in human capital required. Neither of these are met by current systems of occupational classification, and until either or both are met, the manpower economist is in sore need of a valuable tool.

Appendix D

ANALYSIS OF SAMPLE ATTRITION

Prepared by

William B. Clatanoff, Jr.
Research Assistant
Military Training Study

Appendix D

ANALYSIS OF SAMPLE ATTRITION

Initial Design of the Follow-Up Sample

The high sample attrition rate experienced by the Study and shown in Tables D-1 and D-2 raised serious doubts about the validity of the experiment due to the introduction of unknown biases. Although a perfect sample response was never expected, our concern was with controlling the composition of the non-respondents rather than their size. An intensive follow-up survey was run to analyze the biases in our overall technique. The survey's population was the non-respondents, or non-locatables from the initial sample. Included in the sample were all of our initial drawing denoted F's and U's, as well as those veterans returned to the Study by National Certified Interviewers with notations such as: "repeated no answers," "wrong numbers," "disconnects," or "moved with no forwarding address." There were 3,027 of these for the Army, even after the secondary effort aided by the Selective Service System, and 1,405 for the Navy.

The follow-up design and procedures were decided between the Military Training Study and National Certified Interviewers. The sample drawn was essentially no different from the main survey (i.e. a random selection) with the sole restriction being that the intensive follow-up sample be located within SMSA's. Cost consideration led to the restriction on the

Table D-1

Final Result of Army Survey

I. No Phone Number Obtained		1,165
II. Unable to Interview		1,876
Not located[a]	1,862	
Deceased	10	
Returned to Armed Forces	2	
Disabled	2	
III. Final Action		2,560
Interviewed	2,313	
Refused	247	
Total Sample Size		5,601

[a] Repeated no answer, wrong numbers, disconnects, or moved with no forwarding address.

Table D-2

Final Result of Navy Survey

I.	No Phone Number Obtained			667
II.	Unable to Interview			759
	Not located		738[a]	
	Deceased		6	
	Returned to Armed Forces		15	
III.	Final Action			2,459
	Deleted from Sample		1,249[b]	
	Completed		1,210	
	Interviewed	1,084		
	Refused or terminated	126		
				3,885

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[a] Repeated no answer, wrong numbers, disconnects, or moved with no forwarding address.

[b] Length of time out of service at variance with sample specification, caused by Navy error in its tape record submission.

follow-up sample to metropolitan areas. The interviewing contractor was able to control the experiment at a reasonable cost in major cities, where they had clusters of respondents as well as an established supply of interviewers. Even if interviewers had been readily available in rural areas the distance between prospective interviewees, as well as the lack of appropriate checking mechanisms - credit bureaus, multiple listing services, city directories, etc. - pointed away from any intensive effort in non-SMSA's.

Three hundred individuals in SMSA's were therefore selected for analysis. The costs of this follow-up survey were exceedingly high. Due to budgetary considerations, time limitations, and to get the advantages of clustering in fewer SMSA's, it was subsequently necessary to limit the sample. For each individual, the interviewer received the most correct or the most recent address and phone number then available to the Military Training Study. This material was the starting point for their search. The interviewer worked from two forms designed by the Military Training Study specifically for the select study (See pp. D-8 and D-12). The first dealt with interview technique and was to describe the techniques and procedures used in locating the individual. Included were items such as how long the interviewee had lived away from the military's address of record, whether or not there was a phone at this address, and the openness of the listing. The second form was relevant if the veteran was successfully contacted. Through this vehicle we would specify why our initial attempt to contact the veterans had been unsuccessful.

Following this procedure, four distinct groups would have been available for the purposes of analysis. Group A, numbering approximately 2300 would be those located and interviewed via the initial technique. Group B, a portion of the 300 would be those located and interviewed via the follow-up technique. Group C, the residual of the 300 would be those whom we tried and failed to locate in the intensive follow-up, whereas Group D would be the generally non-locatables from the initial sample. For all four of these groups certain information would be available from the Army Master Status Cards as well as coded information from the individual's DA-20 form. This would permit direct comparison between any of the four groups with any other one of the groups. These comparisons could be on the basis of any attributes deemed important in evaluating possible biases in the sample, as well as determining the validity of the assumption that the telephone interview technique is as valid as the more expensive and time consuming face-to-face interviewing technique.

Group B, those located via the intensive follow-up technique could be interviewed in either of two ways. The follow-up interviewer checking leads based upon the information supplied by the Study could locate the individual either at the address given or at a new address and contact them via a telephone interview as in the original sample. Some respondents, those without telephones or with unlisted telephones, were to be interviewed on a face-to-face basis. Some may question the comparability of the results obtained using two different techniques (i.e. telephone versus face-to-face), yet we felt the directed interview nature of the questionnaire would minimize any biases.[1]

Some Results of the Intensive Follow-Up Survey

The intensive follow-up survey sample was based on the non-locatable section of the initial Army sample, specified as in Chapter III by occupational groups as well other variables. The initial preference for the survey was to draw a random sample of three hundred of the three thousand non-located veterans residing in SMSA's. These veterans were drawn from the unlocated universe, and in an attempt to update the locational material in hand, were subsequently rerouted through the Selective Service System. Only those veterans whose addresses or telephone numbers were not up-dated were subsequently included in the interview sample.[2]

The interviewer was forwarded approximately 250 names of veterans clustered in SMSA's within the continental

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[1] This was subsequently confirmed in a similar study of paramedical veterans.

[2] Our concern in the follow-up survey was not to minimize attrition. Rather, we attempted to ascertain characteristics of sub-samples which are not interviewed by our, or any other, study. We therefore eliminated those who were presumably "in transit" during our initial interview attempt in order to concentrate on those unavailable via normal interviewing techniques.

United States. Increased cost and time constraints caused an additional attrition in the sample to 147 veterans.[3] The interviewing was cut off on a specific date, and as a consequence of the organization of the interviewing the veterans who we attempted to locate clustered in a few SMSA's.

The end results of the intensive follow-up survey were allocable to two subsamples. Fifty-six veterans were successfully located and interviewed via the intensive technique (Group B). We attempted to locate ninety-one veterans (Group C) "without success."

The term "without success" distorts the true value of these ninety-one individuals. Although the questionnaire of the Military Training Study was not completed for these ninety-one veterans, much was learned in the process of attempting to locate the veterans. Specifically, there is the value of analyzing selected attributes of these individuals vis-a-vis the other subsamples of our population. In addition, other researchers are provided with an evaluation of the problems and procedures involved in sample location.

Available for study are the interviewer forms for the ninety-one veterans who were not located. These forms yield

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[3] The direct cost for the follow-up survey was $35.00 for each face-to-face interview and $30.00 for each completed telephone interview. The charge for each name checked but unsuccessfully located was $20.00.

FORM 1

3-0517
PRVET

Outline for Inquiry
If Veteran Moved

IF RESPONDENT NOT AT ADDRESS, THAT IS, NO MAIL BOX, NO INDICATION THAT HE LIVES AT THE ADDRESS, interviewer to contact residents in same building or area to learn if:

1. Respondent formerly lived at address
2. When moved; where to
3. Occupation/activities - any tangible information which would help to establish why we could not locate him early in 1966.

REF. #________

INTV. # ______

valuable information and permit some interesting conclusions.

The vast majority of the 91 veterans had moved from the addresses supplied to the interviewers by the Military Training Study. This means that individuals in the stand-by reserves, although required by law to keep accurate residence information on file with the Selective Service System and the Army Reserves do not in fact do so. The reserve readiness is somewhat called into question.

Thirty of the 91 had not left a forwarding address at the time of their first move. Those that left forwarding addresses had usually moved several times since their initial move, and at each point, approximately the same percentage failed to leave a forwarding address going to their next move. The information obtained after the forwarding addresses and phone numbers in these fifty-two cases was not sufficient, owing to refusals or the unavailability of the veterans, to allow a completed interview.

Another major reason why a large proportion of the sample could not be found is that the address initially provided to the interviewer proved to be incorrect. In several cases, the addresses given were actually occupied by commercial establishments. It is unknown whether these addresses previously may have been residences or not. In other cases, the street numbers or street name did not exist within the area given to the interviewers. The Study has been unable to ascertain whether these errors were due to faulty coding, keypunching, clerical error in the handling of the sample, or a deliberate attempt to conceal residence.

Another category of non-locatability is the refusal of persons questioned to give pertinent information to the interviewers. This included eight cases in which the veteran was contacted, yet refused the interview. In nine other cases, close relatives or other persons residing at the address refused to give any information concerning the veteran or his whereabouts. The final non-locatable category consists of 22 cases in which the interviewer was able to locate the address of the veteran but was unable to proceed any further in the investigation. There are several possible explanations why no information could be obtained in these cases. One reason is that while the veteran resided at the given address from which he had moved, he was not known to his neighbors and they were unable to give any forwarding information. Another explanation is that the veteran had lived at the given address, but having moved sometime in the past none of the neighbors, landlord, etc. still live at the contact point. Third, it is possible that the address given was incorrect, and therefore the veteran had never resided at the given address. We also suspect that in some cases, despite all deliberate care in the selection of personnel, the interviewer failed to check all available sources of information concerning the veteran or his whereabouts.

Lastly there is the likelihood that the veteran and his friends, family, etc., do not volunteer personal information and may have deliberately concealed it.

An analysis of those 56 veterans we were subsequently able to locate via the intensive follow-up technique yields even more rewarding information concerning sample validity. In addition to completing the questionnaire, asked of all those located in our sample, the 56 veterans were questioned about their unavailability to the Military Training Study via our normal interviewing procedure (question 5). The results of this questioning are shown in Table D-3. It is obvious that the use of telephone versus a face-to-face interviewing technique in our initial attempt to locate the veterans did preclude the contact with a certain number of our prospective respondents. These include the 25 percent having unlisted phones as well as 12 percent without telephones. Their perceptions overstate the indictment of the telephone. The respondents' notion that they were precluded from contact because the phone was listed under a different surname is invalid. Cases where the veteran resided at the same address given to the Military Training Study but with a different phone listing were noted as a C-2 in our identification system. The true reason for initial failure would probably have been that the respondent was not available or there were repeated attempts to contact with no answer.

REVISED 8-10-67

5-2353 PRVET

SUPPLEMENTARY QUESTIONS

Personal . . . 1
Telephone. . . 2

D-12

1. What is your telephone number at this address? ________

2a. Is this a listed or unlisted number?
Listed . . 1
Unlisted . 2

IF LISTED

b. In whose name is this phone listed? ________

c. Relationship ________

3a. Did you have this same telephone number last year, that is, in 1966?
Yes . . 1
No . . 2

IF NO

b. What was your telephone number last year? ________

c. Was that a listed or unlisted telephone number?
Listed . . . 1
Unlisted . . 2

IF LISTED

b. In whose name was that phone number listed? ________

c. Relationship ________

4. How long have you had your present telephone number? ________
(mo.) (year)

5. When we tried to contact you by telephone last year, but couldn't, do you recall what you were doing at that time . . . working, attending school, or what?

IF INTERVIEWED ON PHONE AND DON'T KNOW ADDRESS ASK

6. What is your address? ________

7. Were you living at this address last year?
Yes . . 1
No . . 2

IF YES TO Q.7

8. Do you recall receiving the letter sent you last year about this study?
Yes . . 1
No . . 2

IF NO to Q.7

9. Where were you living? ________

10. Was that a private residence, a hotel, or what?
Private res. . . 1
Hotel 2
Other ________
(SPECIFY)

Table D-3

Veterans' Perceptions for Our Initial Failure to Complete Interview

Response	Number	Percentage
No telephone	7	12.5
Unlisted telephone	14	25.0
Moved from address of record	14	25.0
Telephone listed under a different surname	6	10.7
Generally unavailable (work or school at night)	9	16.1
Clerical error	2	3.6
Avoided call	1	1.8
Unknown	3	5.4
Total	56	100.

Several cases require further explanation. For two respondents clerical error was determined as the fault. In one case, the address provided the Military Training Study was the correct street address, but the city was noted as Chicago, Illinois, whereas the correct address was Cicero, Illinois. In another instance the address provided was an address at which the veteran had never resided. In one case the respondent said he avoided the call. This is explained by the respondents' call to the Veteran's Administration after receiving the initial letter from the Military Training Study. He inquired whether or not they had heard of the Military Training Study at the University of Maryland and if so, the validity or respectability of such an organization. Whoever he talked to at the VA had not been informed of our work, and as a result the veteran consciously avoided the call of the interviewer the first time contact was attempted. Finally, we must note three cases in which the respondent was characterized as "unknown." In these instances, the respondent said that at the time the Military Training Study attempted its first contact, he could think of no apparent reason why he would not have been available for the interview.

Quantitative Analysis

With this general background of the sample we can proceed to analyze selected attributes of the four sub-components.

The four groups were: Group A, those interviewed via the initial standard telephone technique; Group B, those located via the intensive follow-up technique and interviewed either via the telephone or on a face-to-face basis; Group C, respondents we unsuccessfully attempted to locate via the intensive technique; and Group D, the attrition from our initial sample.

Since a full set of data, including the questionnaire, was not available for groups C and D, our analysis of non-response error centered on characteristics found on the Army Status card and DA-20 form. Ten variables of theoretical significance, both to ourselves and for future interviewers, were selected. These variables and their interpretation are shown in Table D-4.

We tested the null hypothesis that paired groups were drawn from the same population.[4] An alternative design would have calculated statistics for the combined sample and then compared each group against that variate. The procedure adopted, however, heightens any differences between two groups. The Chi-square test was used for variables X_1, X_4, and X_7, while Student's _t_ tested the difference in group

---

[4] Specifically, we tested the null hypothesis that two observations of a given variable are independent of the sample from which they are calculated. The independence hypothesis is

$$H_o:\theta_{ik} = \theta_{jk} \qquad i,j = A, B, C, D; \quad i \neq j. \quad k = 1, 2, \ldots 10.$$

Table D-4

Variables for Analysis of Sample Attrition

X_1 Race; 1=White
0=All Else
Source: Army Status Card

X_2 Age; (1968 - Year of Birth)
Source: Army Status Card

X_3 Years Out of Active Duty; (1968 - Release from Active Duty Date)
Source: Army Status Card

X_4 Component of Entry; 1=Draftee
0=Enlistee
Source: Coded from prefix to service number on DA-20

X_5 Civilian Education; 1=Grammar school
2=1 year of high school
3=2 years of high school
4=3 years of high school
5=high school graduate
6=1 year of college
7=2 years of college
8=3 years of college
9=college graduate
10=post-graduate work
Source: Coded from DA-20

X_6 Months Worked Prior to Active Duty
Source: Coded, sum of months in occupations on DA-20

X_7 Job Prior to Active Duty; 1=Had worked
0=No jobs prior to service
Source: Coded from DA-20

X_8 Number of Dependents
Source: Coded from DA-20

X_9 Aptitude; GT Score
Source: Coded from DA-20

X_{10} Total Number of Months on Active Duty (Excluding basic training)
Source: Coded from DA-20

means for the other variables. Since rejection of our null hypothesis accentuates any group differences, we minimized the type II error subject to Alpha = .05.

The results of this analysis are presented in Table D-5. The superscripted letters indicate a failure to reject the null hypothesis; i.e. we conclude there is no difference between two groups on the variable tested.[5] In general, we see that group A, those interviewed via our initial telephone technique, is different from group D, our sample attrition. However, on only two attributes of the ten does a difference between the two interviewed groups (A and B) emerge.

The most important aspect to notice is the non-homogeneity of our follow-up sample (B and C) and the initial groups (A and D). The follow-up groups had more non-whites, less education, and generally lower G.T. scores. This, we feel, is not a function of the interviewing technique but rather of the clustering of the follow-up sample within SMSA's.

There is little doubt that our initial sample was biased by our failure to contact enough of the non-white population. It would appear, however, that the more intensive (face-to-face) procedure would not eliminate this fault. It is not at all clear that the reason for this bias is that more non-whites do not have telephones. Rather, it appears that

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[5] The letters used are a for A with B, b for A with C, c for A with D, d for B with C, e for B with D, and f for C with D.

Table D-5

Comparison of Four Army Samples

	A Interviewed	B Located Follow-Up Technique	C Tried and Failed on Follow-Up	D Sample Attrition
Number in Group	2074	56	91	2718
X_1=Race (Percent White)	94.9%	83.6%^{de}	71.1%^{d}	89.8%^{e}
X_2=Age*	28.6^{a} 2.25	28.7^{ade} 2.38	28.0^{df} 2.28	28.3^{ef} 2.45
X_3=Time Out of Active Duty*	5.02^{abc} 1.75	4.96^{ade} .331	4.98^{bdf} .298	5.12^{cef} 3.01
X_4=Component of Entry	60.2%^{a}	63.6%^{ade}	72.2%^{df}	63.7%^{ef}
X_5=Civilian Education*	5.26 1.70	4.60^{de} 1.96	4.43^{d} 1.59	4.78^{e} 1.91
X_6=Months Worked * Prior to Service	26.3^{a} 27.5	23.6^{ade} 21.3	19.1^{d} 21.6	24.0^{e} 25.8
X_7=Job Prior to Service	88.1%^{a}	94.5%^{a}	77.8%^{f}	84.8%^{f}
X_8=Number of Dependents*	$.944^{ab}$ 1.06	$.764^{ade}$ 1.07	$.800^{bdf}$ 1.13	$.827^{ef}$ 1.09
X_9=Aptitude (GT)*	109.9^{a} 17.93	106.5^{ae} 19.86	97.43 22.61	103.1^{e} 19.95
X_{10}=Total Months of Active Duty*	24.4^{a} 7.34	25.2^{ade} 7.20	25.8^{df} 6.14	25.0^{ef} 6.97

*Mean on Top, Standard Deviation on Bottom there may be an inherent limitation on any researcher's ability to locate and successfully interview all subsections of the population. This would appear to be a considerable problem within the metropolitan areas at this time.

In addition to the Race variable, the only significant difference between our initial sample and those located via the intensive technique was the level of education (X_5). The The original interviewing procedure yielded a sample with a higher average level of schooling than the residual. The study hypothesized that the non-locates would also have a greater dispersion. That is, we would lose not only the dropouts but also the more mobile college graduates. F-tests on the standard deviations showed this to be true when group A was compared to groups B and D. However, the "hard core" non-locatables, group C, have the least dispersion in educational achievement in addition to the lowest level. This is strong evidence that even intensive attempts to locate and interview the lower socio-economic groups will result in a sample which is biased upwards.

This observation is heightened when the aptitude (GT) of the four groups is considered. Although groups A and B are similar, there is a very low (GT = 97.4) mean score for the attrition from our follow-up sample. We again see that the attrition, regardless of interviewing technique, is composed of the least advantaged.

It was noted in Chapter V that job seeking and transference appeared to have an inverse relationship to aptitude. If the benefit of military human capital is inverse to the education and measured aptitude of the Army's throughput, then the implication of the sample attrition is that we have underestimated the value of military training to the civilian sector.

Chapter V and Appendix E each analyze observations of the gain, to society or the individual, from military training. If the gain is greatest to the less advantaged, and the less advantaged the least likely to be included in the analysis, then our prior observations should be considered as "low" estimates of the spillover effects of military human capital. The upward bias of the observations yield a downward bias to the conclusions. We have also concluded the effect of the military to be greatest in the absence of a pre-service job. Here again we see a possible underestimate of gains, since fewer of those not interviewed had pre-service jobs (X_7) and the average pre-service work experience (X_6) was also lower.

Variables X_2, X_3, and X_8 were examined to determine the reason for non-response. Since mobility is a habit of youth, we expected the attrition to be somewhat inverse to age (X_2). This is so, but only marginally. The *a priori* assumption that our ability to interview would decrease with time out of service appears unfounded. No significant differences appear between any of our groups on the basis of this variable (X_3). As expected, the dependency or marital status (X_8) varies between groups A and D. It is difficult to attach significance here, however, since the standard deviation is so high. A further difficulty is that this variable was recorded as of the date of discharge, so the general impression of family being less mobile than single males is somewhat suspect.

We conclude that our initial telephone survey technique produced a sample which differed from the non-respondents. Despite the first impressions given by those subsequently interviewed by a combination of face-to-face and intensive follow-up telephoning (Table D-3), we feel that the choice of instrument did not materially affect this result. Rather, we see that samples located by the two techniques produce similar attributes. The importance of this is revealed by the characteristics of the non-respondents, an awareness of which is necessary in interpreting the results elsewhere in this study.

Appendix E

AN ESTIMATION
OF THE
MILITARY CONTRIBUTION
TO HUMAN CAPITAL

Eugene L. Jurkowitz
March 1968

Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, in the Faculty of Political Science, Columbia University.

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The author assumes the responsibility for the contents of this study, including omissions and imperfections.

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AN ESTIMATION OF THE MILITARY CONTRIBUTION TO HUMAN CAPITAL

Introduction

During the early 1960's, the U.S. Army provided vocational training to approximately 300,000 first-term enlistments per year (prior to the present Vietnam military expansion). In view of the very considerable investment of resources by the military in training men, as indicated by this single statistic, a question of practical significance concerns the return from this investment accruing to individuals when they leave active service. Moreover, since much of this investment involves individuals who leave the military after their first term, there is a continual flow of human capital from the military to the nonmilitary sector of the economy. Over time, both the training and the composition of military occupational specialties have been changing, primarily in response to technological changes. The result is that there is now a closer correlation between military and civilian occupations.[1] This convergence indicates a potential spillover effect from the military's manpower investment to the civilian sector.

The hypothesis suggested by this convergence is that vocational training of various types received by individuals in the military is of economic benefit to its recipients when they return to the civilian sector. This hypothesis would be relevant even if the military's allocation of manpower to the various occupational training and duty assignments were wholly arbitrary. However, the military does attempt to use sophisticated techniques in allocating its manpower pool to specific training schools and duty assignments. The military has developed selection, allocation, schooling, and training procedures for manpower; gives weight to skills and knowledge an individual may have had prior to entering; attempts, via various testing procedures, to place individuals according to aptitude; and considers individual vocational preference in making assignments. Thus, the future returns to the military, the individual, and the economy can be expected to increase, since investment in human capital is likely to yield a higher return if training matches aptitude.

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[1] This subject has been investigated by Albert D. Biderman and Laura M. Sharp, "The Convergence of Military and Civilian Occupational Structures," paper read at the 60th Annual Meeting of the American Sociological Association, Chicago, Illinois, 1965 (Washington, D.C.: Bureau of Social Science Research, Inc., 1965).

The more efficient the military is in training its manpower, the greater the benefits to the individual and society. There are no systematic reasons for believing that the military, given certain constraints, does not operate efficiently. The question of efficiency, however, is peripheral to this study.

The convergence of military and civilian skills further implies that a considerable portion of the training extended to servicemen is general (transferable) rather than specific (nontransferable).[1] Recognition of the potential transferability of its investment, however, forces the military into a self-defeating situation. The military promotes itself as a place to learn a useful skill or trade as an inducement to enlist, thus attracting a large supply of volunteers for vocations that can most readily or most advantageously be transferred to the nonmilitary sector. Once investments are made in these individuals, however, they are the least likely to remain in the service via reenlistment. Thus, although the military has increased its turnover of manpower, it has not increased its returns from its investment. However, this policy of inducement may have, in turn, contributed to the convergence of military and civilian functions.

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[1] Professor Gary S. Becker defined pure cases of general and specific training in the following manner: "Completely general training increases the marginal productivity of trainees by exactly the same amount in the firms providing the training as in other firms....Completely specific training can be defined as training that has no effect on the productivity of trainees that would be useful in other firms." _Human Capital_ (New York: National Bureau of Economic Research, 1964), p. 18.

The problem is partially reflected in reenlistment rates by occupational specialization. These rates vary inversely with the skill level and degree of transferability of the occupation. Presumably, a major reason why some individuals leave the military and others do not is their expectation of economic opportunity in the civilian sector.

The military, aware of the economic loss resulting from this situation, had undertaken studies to consider differential pay rates as an inducement to reenlist.[1] There is, however, a constraint upon the degree to which wage rates can be adjusted while maintaining compatibility with the hierarchy of command. A problem might arise, for example, if a private serving as a computer programmer earned more than his sergeant. At the present time, the degree of general (transferable) training an individual receives in the military bears little relationship to his remuneration while in the service; he receives approximately the same total payments as an individual who receives specific training.

Thus, in this study it is recognized that the military makes substantial investments in human capital. It is further recognized that this investment is not totally arbitrary. There is also no question that some of the returns from this investment are, by definition, reaped by the military. But very little is known about the spillover returns of this investment to individuals or to the economy in general when these individuals return to the civilian sector. It is hoped that the findings within the scope of this inquiry will be of use in formulating policy -- both Defense Department manpower policy and manpower policy in general.

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[1] See Gorman C. Smith, "Occupational Pay Differentials for Military Technicians," unpublished Ph.D. dissertation: Columbia University, 1964.

CHAPTER I. HYPOTHESIS AND PROCEDURE

Hypothesis

Vocational Training of Various Types Received by Individuals in the Military Is of Economic Benefit to Its Recipients When They Return to the Civilian Sector.

This study examines whether military vocational training is of economic benefit to its recipients, with economic benefit defined as increased post-military earnings resulting from military vocational training. Military training, economic benefit, and the sample are defined below, in terms of the qualitative and quantitative approaches used.

Military Training

The economic gain to veterans may stem from two sources -- military life per se and military vocational training. This study was not concerned with economic benefits from military life per se (which could possibly be negative); however, the post-military earnings of veterans in the sample will necessarily reflect the joint effect of these two sources. Military life per se may affect the individual in many ways which potentially increase his productivity and earnings. Exposure to the military can increase an individual's awareness of his abilities and opportunities; it will increase his mobility which, in turn, increases his opportunity set; and the military experience may also increase his maturity, motivation, and capacity for self-discipline.

In addition to the economic value of military life per se, the individual may have received vocational training and experience in some particular field while in the military. This study was confined to the differential economic impact of military vocational training which, in turn, was confined to selected fields.[1] The occupational groups selected reflect significant areas of the military training effort, yet a variety of occupations, employees, and prospects in addition to varying degrees of openness and trade influence.

Sample Design

Every individual in the Army is awarded a primary military occupational specialty (PMOS). Cell sizes, established for each PMOS number, formed the basis for various occupational groups (i.e., infantryman, craftsman, data processing skills, etc.). Thus, by sample design, each individual was placed in an occupational grouping on the basis of his PMOS. It was assumed that the award of a particular PMOS indicated a certain minimum of skill, knowledge, and aptitude (i.e., human capital) implanted by the military, which could be transferred into post-military earning power.

Each grouping was homogeneous in that all its constituents had similar PMOS's. The individuals varied, however, in the length of duty in this PMOS. An individual may also have had one or more DMOS's (duty military occupational specialty), which may not have corresponded to the particular clustering of PMOS numbers of his group. For example, an individual may have been awarded a PMOS as a tab machine operator, which placed him in the data processing skills group. In addition, he may have served as an automobile repairman. Explicit recognition of such cases was necessary to preclude an assumption that training as a tab machine operator affected earnings which actually resulted from training as an automobile repairman, or some combination of both.

Caution must be exercised in observing whether the individual was awarded this PMOS because of the military or in spite of it. That is, in cases of certain bypass skills the individual may have been awarded a PMOS on the basis of his premilitary schooling and occupational experience. Of course, even in these cases the individual may still have enhanced his potential future earning power because of the military due to experience in his field and possibly some on-the-job training.

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[1] See Appendix A for a complete list and description of the selected military occupational fields used in this study.

Thus, this study dealt with a probability sample from a specific population. Military service was a temporary disruption in the life cycle of all the individuals in the sample; i.e., the individual moved out of the civilian sector for a period, after which he returned. This disruption, though, may have been of value in his post-military employment. In addition, the disruptive experience, by definition, suggested a number of influences on the individual related to the transition process from civilian life to military and back to civilian life.

Economic Benefit

The economic performance (e.g., type of job, earnings, etc.) of an individual depends upon supply and demand factors. Because of the nature of the data and the design of the study, this analysis was considered mainly from the supply side. The analysis centered on the disposition of the vocational investment implanted by the military into the sample of individuals; that is, whether individuals (except, by definition, infantrymen) in the sample increased their human capital stock as a result of military vocational training. Specifically, comparisons were made of the observed earnings of individuals trained in particular military occupations with the observed earnings of infantrymen (no vocational training) after allowing for various other factors.

The individual's post-military money income was selected as the dependent variable to indicate economic performance. An index of economic success or attainment was sought that could be related to various educational backgrounds, aptitudes, and different types of military vocational training. It was recognized, however, that even if earned could be separated from non-earned income, income is not a perfect index of economic success or attainment, since it does not reflect market rigidities, nonpecuniary factors, expectations of future income, or numerous other items.

In calculating economic performance of the sample of individuals, we did not consider these returns as compared with costs to the individual. That is, rates of return were not calculated. This is because any estimates of all the returns or costs to the individual would have been crude approximations, at best. Also, no attempt was made to consider the rate of return to the military from this investment. The benefits to the military are not only difficult to estimate but may even be impossible to measure insofar as they relate to national defense. Neither could costs to the military be isolated to the degree the analysis required.

Rather than taking an "economic snapshot" of the sample of individuals in their post-military economic environment, economic data were obtained for a period of three or more years which exhausted their post-military time. Many individuals had more than one occupation during this period. Thus, some may have taken a first job from which they benefited economically from their military exposure, but subsequently may have left this job. Conversely, some individuals who did not initially use their military training may have done so subsequently. This study allows for these movements.

An objective test to our hypothesis, observed earnings, was employed. It follows that zero economic benefit would be indicated for a case such as the following.

An individual entered the military and was trained in a certain field, e.g., military policeman. Upon leaving active service, the individual accepted employment in a related civilian occupation. If the individual received no more remuneration than someone alike in all respects except for exposure to police training while in the service, it was concluded that the military vocational training was of no economic benefit to the individual even though he apparently transferred a skill learned in the military.

The above case does not preclude the presence of benefits except in the context of the limited model. Perhaps there are subjective benefits to the individual in choosing this job, or objective benefits to the firm and society because this individual performs better on the job or requires less training, but such factors are precluded insofar as they are not reflected in the individual's earnings. Perhaps also, in a broad sense, there is a gain to society in that military vocational training has to some extent favorably altered the civilian occupational structure from the supply side; i.e., military vocational training has a positive effect on structural unemployment, hence providing external economies to society as a whole. Of course, the opposite of such restructuring could also be true. The data, however, did not allow examination of benefits other than those measurable in increased individual earnings.

If some economic benefits from military vocational training do exist, we do not mean to imply that an individual chose the best alternative. An individual might have upgraded his future earning power even more than the observed returns had he never spent time in the service.[1] This question is irrelevant, however, because the obligation of the individual for military service is taken as given.

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[1] In the above case, however, individuals may be more likely to pay a larger portion of the costs of training and, therefore, be less likely to undertake such training unless the returns were both privately *and* socially worth the investment. That is, if there were no capital imperfections, no future uncertainty, and no externalities, the larger the portion of the costs of human capital investment borne by the individual the closer would be the individual and social economic interests.

Thus, this study was not concerned with questions of private versus social returns. Nor were any attempts made to examine the efficiency of the military's investment. That is, some other institution might or might not be able to implant these or other vocational skills with less cost or higher returns to the individuals who receive this training. This study examined the relatively limited question of the existence and magnitude of any economic returns from vocational training received while in the military to the individuals in the sample.

Procedure

On one level, an independent analysis was performed on each of the occupational groups. On a second level, each group was compared with a base group (infantryman) to test for significant differences in earnings and other variables. On a third level, subgroups were selected on the basis of specific criteria (e.g., race) for comparison among themselves or with the base group (infantrymen).

In analyzing each group independently, the question was whether the acquisition of the PMOS enabled the individual to acquire more post-military income, after allowance for other variables, than if he had not had that military occupational training.

One approach to this question was to isolate those individuals in the given PMOS group who have a post-military, civilian job related to the PMOS group and compare this group with the others from the same PMOS group. To test this question, it was necessary first to determine civilian occupations comparable with the groupings of PMOS numbers and the relationship between civilian occupations and the activities pertaining to PMOS groupings. These relationships could vary in degree from zero (no relation) to one (perfect relation). To determine the degree of transferability, the individual was asked to rate his work in each civilian job as very similar, somewhat similar, or not at all similar to the training or experience obtained in the service.

The group was thus dichotomized into individuals who made actual and explicit use of their vocational training and those who did not. The words actua and explicit use are emphasized because they indicate conceptual problems. First is the individual's interpretation of transferability. The fact that a person is in an occupation which he thinks is not related to military vocational training does not necessarily mean that this training has not benefited him economically. The training may have benefited him in a subtle way that is not readily apparent. That is, the functions and characteristics of any job are numerous and only some can be taken into account.

A further test of such partitioning of the sample of individuals on the basis of the relationship of their post-military occupations to their PMOS numbers was whether this would ascertain the economic impact of differential human capital investment. This investment presumably had a direct, potential economic effect on the individual, but the source of this impact was on the supply side; that is, the quality of the labor supply has presumably been affected and it is this change in quality which affects the disposition of this resource. Thus, it may very well be that some of the economic returns to an individual in an apparently unrelated occupation are, in fact, attributable to the military vocational training. The effect may be traced to enhancement of his performance on the job due to transferral of training, even though the training was actually for a different type of job. The transferral effect may be even less direct. Exposure to a particular vocation in the military may have significantly affected attitudes toward types of occupations desired -- a "negative transferral"; i.e., not necessarily a continuation of the military vocational field. It might follow that because of this change in motivation, an individual enters a more remunerative nonrelated occupation, making better use of his earnings potential than if he had not been exposed to the particular military vocational training.

Another shortcoming to the direct comparison of post-military transferability to PMOS groupings is that the individual may have used his military vocational training as leverage in obtaining his nonrelated occupation. Assuming that there are no serious obstacles to his procuring a related post-military occupation, one can assume that the individual should do at least as well in the nonrelated occupation. That is, the individual recognizes his increased opportunity cost from military vocational training.

Thus, in comparing earnings for those in the group explicitly using their military vocational training and those who are not it might be discovered that those who are actually working in a related occupation are earning the same or less than those in a nonrelated occupation. The above discussion suggests that such results could occur and yet not contradict the hypothesis that military vocational training affects future economic earnings favorably. This assumes that there are no significant differences between these two groups in such variables as ability and level of education. Furthermore, in such a case, the magnitude of the benefits of military vocational training could still be relatively large.

In light of the above, an alternative approach in testing the hypothesis was to compare the earnings of the individuals in the whole PMOS group with an appropriate base group. The actual group and base group are alike (or adjusted to be alike) in many variables, but different in one important variable. This difference is the specific human capital investment by the military which potentially affects every member in the actual group from the supply side.

Thus, a group of individuals who received only infantry training was included in the sample to serve as a surrogate for military activity per se. It was assumed that infantry training would be of no value in influencing post-military economic activities; i.e., zero economic benefits would stem from the vocational aspect of infantry training. However, the individual receiving infantry training would have experienced the discipline and experience of military activity per se as the individual from the PMOS groupings and the concomitant impact on future economic activity from that source.

The earnings of individuals from each occupational (PMOS) grouping were compared with the infantryman's earnings to examine the hypothesis. Allowance was made for variations in each qualitatively different group (i.e., each PMOS group) of quantitative and categorical variables, including level of education, index of ability, and race. Implied in such comparisons are the following assumptions: First, the economic value of military life per se is independent of the occupational grouping; and, second, the economic value of military life per se is independent of the magnitude of the qualitative variables or the nature of the categorical variables. In effect, the economic effect of military life per se is the same whether the individual served as an infantryman, an electrician, an automobile repairman, or in any other occupation. Further, it was assumed that the effect of military life per se was the same regardless of level of ability or education, and of the race, age, etc. of the individual.

These assumptions are not necessarily correct and, therefore, may have caused the results to be exaggerated or underestimated. However, there is no basis on a priori grounds to assume any specific correlation.

By project design, information for each individual was coded for the following variables, which were used in examining the hypothesis:

1. Primary awarded occupational specialty (PMOS).
2. Duty occupational specialties (DMOS).
3. Time spent in each primary and duty occupational specialty.
4. Relation of any occupation held prior to active service to the military occupational specialty.
5. Component of entry (draftee or enlistee).
6. Type of enlistee (e.g., "draft-induced," one who in the absence of the draft would not have enlisted).
7. Interest in a particular vocational field at the time of enlistment.
8. Notification to the military of (7).
9. Training received (or not received) in preferred area.
10. Service in this field (or not).
11. The degree of similarity of each post-military occupation to military vocational training.

These variables provided ample data for partitioning the sample into meaningful domains to test aspects of the hypothesis. In addition, information was collected on other variables, such as level of formal education, race, aptitude, on-the-job training. etc. Using these data, subgroups were selected on the basis of specific criteria (e.g., race) for comparison among themselves or with the base group (infantrymen).

A specific example was to partition the enlistees in the sample into true enlistees and draft-motivated enlistees. A true enlistee is one who would have enlisted anyway, even if there had been no draft obligation. Presumably, this individual expects a positive net gain from enlisting, taking into account both pecuniary and nonpecuniary factors. A draft-motivated enlistee is one who in the absence of the draft would not have enlisted. That is, the expected net gain from enlisting is negative. But this negative net gain is less in absolute terms than the negative net gain that would result from being drafted. The cost of being drafted must be weighted by the appropriate probability and discounted over the appropriate time period. The draft-motivated enlistee, therefore, minimized his expected loss by enlisting.

The possibility of response errors affecting the results must be recognized. For example, in the comparison above the means used to dichotomize the enlistees is admittedly imperfect. The individuals were asked in an interview whether, in the absence of the draft, they would have enlisted.[1] What type of an enlistee an individual says he was is a function largely of future expectations and should presumably be asked at the time that a person enlisted. Instead, we asked this question at a much later time. During this time, expectations for the various individuals may or may not have been realized and these realizations may have biased the answers. *Ceteris paribus*, a true enlistee who stated an occupational preference and who was trained and served in that preferred area would be more likely to use that skill than a draft-motivated enlistee who was thrust into some arbitrary training and duty assignment. There are some possible checks on the answers by individuals as to type of enlistment. We can observe whether, as would be expected, a larger percentage of true enlistees had particular training preference. Furthermore, the percentage by vocational type can also be considered.

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[1] The specific question asked is: "First, let's talk about when you entered the service....if you had not had a military obligation before you entered the service, how likely would it be that you would have enlisted....would you say that you *definitely would* have enlisted, *probably would* have enlisted, *probably would not* have enlisted, or *definitely would not* have enlisted....or are you not sure what you would have done?"

Since many of the variables are categorical in nature, use is made of dummy variables. Categorical variables can only be quantified for meaningful statistical use if the cardinal nature of these variables is known or assumed.[1]

In summary, the analysis of the data should provide insight into various conceptual and empirical questions. Included in the analysis were questions such as those relating the extent to which each of several variables is useful in predicting a specific aspect of an individual's future economic behavior (income). Data constraints may limit some of the inferences to a qualitative rather than a quantitative analysis. Finally, any generalizations from the sample to its specific universe or to the civilian population will necessarily be made with caution.

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[1] Furthermore, quantitative variables can be used for meaningful statistical use only if the nature of their cardinality is known. For example, to use years of education received or aptitude test scores as quantitative variables statistically, it must be known or assumed they are cardinal in nature. For example, for a quantitative figure such as number of years of college education received, each individual might have a 0, 1, 2, 3, 4, or greater value. If the figures are used as is, four years of college are weighted four times as much as one year, and so on. In addition, if there is no basis on either a priori or other grounds for assuming a particular form of functional relationship of these variables to other variables, it may be necessary to resort to class partitioning or dummy variables. These techniques provide an indication of the relationship, if any, which is independent of any assumed functional relationship.

CHAPTER II. STATISTICAL TECHNIQUE

The statistical technique used to explain the hypothesis was the analysis of covariance with the use of dummy variables. The analysis of covariance is a statistical procedure which tests for differences in the dependent variable among two or more populations after allowing for the effects of the separate independent variables (including the intercept variable). The usual relationship assumed between the dependent variable and a given independent variable is that of linearity, although allowance can be made for some type of nonlinearity. In performing the analysis of covariance, it is sometimes possible, and often important, to separate the causes of differences into slope and intercept effects.

The analysis of covariance tests whether or not two or more regression equations differ significantly from one another. Usually the purpose of such testing is to justify pooling of data from two or more populations for various purposes, such as increasing the degrees of freedom in the pooled sample.[1] In this study, if two appropriate regressions did not differ significantly and could therefore be pooled, this similarity indicated rejection of the hypothesis that vocational training has an economic impact. Specifically, if the regression differed significantly, an explanation of the difference was required; i.e., is some (or all) of the difference due to military vocational training? Furthermore, given the existence of an economic effect due to vocational training, is the effect an intercept or slope effect (or both)?

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[1] Edwin Kuh, Capital Stock Growth: A Micro-Econometric Approach (Amsterdam: North-Holland Publishing Company, 1963) pp. 116-156.

The following procedure was employed: Two samples were chosen from different populations. The two populations represented different amounts and qualities of vocational training. The sample from each specific vocational group was compared with a sample having zero military vocational training, namely, the sample of infantrymen. A specific sample, e.g., automobile repairmen, was compared with the sample of infantrymen. Supposing that the two samples differed only in one respect--that members of one group had training as automobile repairmen in the service--the appropriate statistical test would then be an analysis of variance. This tests whether the average incomes of the two groups differ significantly.

Data on numerous variables other than income were available; many of them related to income, as expected. It was observed that the average values and dispersion of these variables differed between the two groups. Moreover, there was no basis for assuming that the relationship of these variables within each group to the dependent variable income (the slopes or partial regression coefficients) was the same. Furthermore, there was no basis for assuming that the effect of all variables not explicitly considered in the regressions (the intercept value) was the same for the two groups. For these reasons, we employed the analysis of covariance test.

To perform this test, a regression was run for each separate sample and one or more regressions for the two samples pooled. The number of pooled regressions depends upon the significance and nature of the data as well as the hypotheses being tested. In algebraic terms, the test was as follows:

Assuming three independent variables, a separate regression was run for each group.

EQUATION 1: (Group I) $Y_1 = a_1 + b_1X_1 + b_2X_2 + b_3X_3$

n_1 = number of observations)

EQUATION 2: (Group II) $Y_2 = a_1{}' + b_1{}'X_1 + b_2{}'X_2 + b_3{}'X_3$

(n_2 = number of observations)

The two samples were pooled and a regression was run on the same variables:

EQUATION 3: (Group I and Group II)

$$Y_p = a_1{}'' + b_1{}''X_1 + b_2{}''X_2 + b_3{}''X_3$$

($n_1 + n_2$ = number of observations)

If the two regressions differ significantly, either in slope or intercept coefficients, the residual sums of squares about the pooled regression line would be significantly greater than the sum of the residual sums of squares about each separate regression line. Calling the latter value RSS_A (RSS_A = RSS from Group I plus RSS from Group II) and the former value RSS_C, and using the appropriate degrees of freedom for denominators, we performed the F-test for testing the hypothesis of difference in slopes or intercepts. This F-value, or F_1, was derived from the following equation:

EQUATION 4:

$$F_1 = \frac{RSS_C - RSS_A}{N-K-N+2K} \Big/ \frac{RSS_A}{N-2K} = \frac{RSS_C - RSS_A}{K} \Big/ \frac{RSS_A}{N-2K}$$

where K = the number of independent variables, including the intercept term. If this F-value is significant, the two regressions differ significantly in either the intercept term or at least one of the slope coefficients.[1]

It was not known, however, which coefficient(s) differed between the two equations since the F-test treats all these variables the same. But, even if no overall significance were found, regressions would still be run on the pooled sample, inserting a dummy variable for vocational training to observe the t-value for this specific variable.[1] This procedure is identical to the F_3-test discussed below. In addition, we inserted in the pooled regression either the dummy variable multiplied by a specific independent variable or we inserted some combination of dummy variables in the pooled regression. This is logical in terms of the hypothesis -- the determination of the impact of vocational training.

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[1] Of course, the probability here of a type-I error is one minus the level of significance with which the F-value is tested.

The form of the dummy variable for vocational training depended upon the hypothesis. If it were assumed that the existence of vocational training affected the level of income independently of the other variables, the dummy variable would be used alone. If it were assumed that there were some interaction between the dummy variable and a specific independent variable, then the dummy variable would be multiplied by the particular independent variable and this term added as an additional variable in the regression. This, in turn, would affect the value of the slope for the independent variable. Or, some combination of the two types could be used.

Regression on the pooled samples was run, allowing for various possible effects of the dummy variable which, a priori, seemed meaningful. However, when using in the same equation the dummy variable and the dummy variable times one (or more) specific independent variable(s), the two (or more) additional variables will tend to be highly correlated. This multi-collinearity will especially increase the standard error of the regression coefficient for each of the two new variables.[2]

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[1] It is likely (and the more variables, the greater the probability) to find specific variables significant in the t-value sense, but all variables together not significant in the F sense.

[2] The formula for the standard error of the partial regression coefficient is:

$$S_{b_{12.34\ldots m}} = \sqrt{\frac{\bar{S}^2_{1.234\ldots m}}{nS_2^2\,(1-R^2_{2.34\ldots m})}}$$

If a significant F_1-value exists (i.e., the two regression equations differ significantly), further procedure is necessary to narrow these differences to slope or intercept effects; more specifically, to determine whether the insertion of a dummy variable(s) for vocational training can explain the difference(s). This procedure involves running a regression for the two samples pooled and inserting an additional variable, the dummy itself.

EQUATION 3 NOW BECOMES EQUATION 5.

$Y = a_1'' + b_1''X_1 + b_2''X_2 + b_3''X_3 + a_2Z$, where Z is a dummy variable which takes on the value zero or one (one for those individuals who had vocational training and zero otherwise). This allowed for differences in the levels of the two lines. If the slopes were identical in the two separate equations, then the residual sums of squares about Equation 5 = RSS_B would be identical to the sum of the residual sums of squares about the two separate equations = RSS_A. To test for significant differences in slopes, F_2 was computed.

EQUATION 6: $$F_2 = \frac{RSS_B - RSS_A}{2k-2-k+1} \Big/ \frac{RSS_A}{n-2k} = \frac{RSS_B - RSS_A}{k-1} \Big/ \frac{RSS_A}{n-2k}$$

If F_2 is significant, it was concluded that the slopes of the two equations differ significantly. The conventional procedure is to terminate here and not to test for differences in the intercept value. It is not meaningful to perform this test unless there is some basis for assuming a particular relationship of the intercepts.[1]

If the slopes do not differ significantly, we test for differences in intercepts given equal slopes by calculating F_3.

EQUATION 7: $$F_3 = \frac{RSS_C - RSS_B}{1} \Big/ RSS_B \Big/ n-2-k+1$$

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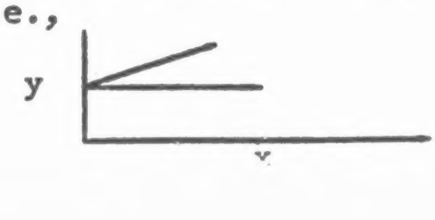
[1] For example, one might assume that the lines all go through the same point on the vertical axis; i.e.,



These tests offer a great deal of flexibility in pinpointing the important variables that explain the differences. For example, we might find a significant F_1 value, but allowing for a dummy variable to affect the intercept we might also find an insignificant F_2 value. It could be concluded that the difference was due largely to the dummy variable itself. Conversely, even allowing for the intercept differences, F_2 could still be significant. Additional variables could also be added to Equation 5 thus narrowing the number of variables whose slopes differ. That is, Equation 5 would become Equation 5':

$$\text{EQUATION 5':}\quad Y = a_1'' + b_1''X_1 + b_2''X_2 + b_3''X_3 + a_2Z + b_4ZX_i = RSS_B'$$

where i could take on the value 1, 2, or 3. If i were equal to 2, then

$$F_2' = \frac{RSS_B' - RSS_A}{2k-2-k+1} \Big/ \frac{RSS_A}{n-2k} = \frac{RGS_B' - RSS_A}{k-1} \Big/ \frac{RSS_A}{n-2k}$$

If F_2' was still significant, it could be reasoned that it was the slopes of the remaining two values (1 and 3) that differed. We were mainly interested in inserting dummy variables for vocational training, since the impact of vocational training was the focus of this study. This technique of analysis of covariance was applied to the sample data as described in the following chapter.

CHAPTER III. EXAMINATION OF HYPOTHESIS

The main purposes of this chapter are: (1) To analyze the data to test the broad implications of the hypothesis that, ceteris paribus, those who have had vocational training earn more in their post-military employment than those who have not had such training; (2) to render an overall perspective of the data; and (3) to suggest specific areas for further study.

Application of Analysis of Covariance Test to Examine Hypothesis

The analyses of covariance tests were applied to the sample data.[1] Regression equations were calculated from 1,941 observations which included data on individuals from Army records and telephone interviews. These 1,941 observations represented completed interviews from an original sample of 5,101.[2] Attrition from the original sample of 5,101 was due mainly to inability in locating the individuals rather than refusal to respond to the interview.[3] Army records provided much data on the individuals whom we were unable to interview. A comparison between the interviewed and uninterviewed groups was made for certain variables such as age, education, and ability. The two groups differed relatively little with respect to these variables.[4]

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[1] A detailed explanation of the source and content of the data is found in Appendix B.

[2] There is a total of 2,313 completed interviews, some of which, however, were discarded for such reasons as wrong PMOS number, incorrect or missing data, etc.

[3] For a complete breakdown of the original population and reasons for inability to interview, see Appendix C.

[4] See Appendix D for results of this comparison.

The 1,941 observations were partitioned into ten separate groups on the basis of primary military occupational specialty (PMOS).[1] The sample of individuals was initially selected on the basis of the PMOS numbers, which were grouped according to meaningful occupational categories. These ten occupational groups and their corresponding cell sizes are presented in Table 3.1.[2]

TABLE 3.1

Table of Occupational Groups

Group 1	Military Police	Total = 216
Group 2	Electronic Data Processing Machine Operators	Total = 114
Group 3	Operatives	Total = 241
Group 4	Communications Repairmen	Total = 78
Group 5	Repairmen (Radio, TV, and Automobile)	Total = 232
Group 6	Warehousemen	Total = 121
Group 7	Esoteric Skills (e.g., Countermeasures Search Specialist	Total = 99
Group 8	Infantrymen	Total = 202
Group 9	General Duty Soldier	Total = 70
Group 10	Clerical, Financial, and Accounting Skills	Total = 568

The PMOS is the original occupational specialty in which the individual was awarded competence by the military; that is, every individual in each of the groups was awarded one of the PMOS numbers for the corresponding group for competence in that occupation (e.g., military police . . . contain PMOS 950 and 951). This was assumed to represent a finite amount of human capital invested by the military.

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[1] For a complete list of the PMOS numbers used in this study and a brief description of each, see Appendix A.

[2] See Appendix E for a breakdown of the original population by PMOS group and the attrition rate for each PMOS group.

A total of 69 variables was selected for analytical purposes which (excluding the dependent variable) can be classified into four categories:

Category (1): Intermediate variables which were used to compile composite variables and thus were not used directly in any regression runs. For example, three separate variables indicate existence of on-the-job training for each of three possible post-service jobs. The corresponding composite variable is Z_{63} (see below).

Category (2): Selected variables related to the dependent variable, income, but not related to the hypothesis. These include educational level, ability index, etc. (see Table 3.2).

Category (3): Variables directly related to the hypothesis (see Table 3.3).

Category (4): Variables indirectly related to the hypothesis (see Table 3.10).

TABLE 3.2

Variables from Category (2) Which Are Related to Income

Z_8 = Highest civilian educational level achieved (1 = grammar school; 2 = 1 year high school; 3 = 2 years high school; 4 = 3 years high school; 5 ... 9 = high school graduate ... college graduate).

Z_{13} = GT score (intelligence). Actual number = 3 digits.

Z_{43} = Number of post-service jobs held (index of motility).

Z_{64} = Year of birth (age index: 1 = 1934; 2 = 1935; ... 9 = 1942).

Z_{67} = Number of dependents (0 = 1 dependent; 1 = 2 dependents).

TABLE 3.3

Variables Directly Related to the Hypothesis

Z_{60} = Relationship of post-service job(s) to military vocational training (index). Each of three possible jobs was weighted by the length of time held and the relationship of each job to military vocational training (0 = no relationship; 1 = somewhat related; and 2 = highly related). Z_{60} is thus a continuous variable with a range of 0 to 6.

Z_{66} = Vocational training.
0 = infantrymen (having no military vocational training).
1 = all non-infantrymen (have had some military vocational training).

The following 4 variables are products of Z_{66} and 4 of the variables from category (2). The coefficient of this term in a regression reflects a slope effect to the variable with which it is multiplied:

Z_9 = (educational level index)

Z_{12} = (age index)

Z_{15} = (intelligence index)

Z_{16} = (mobility index)

The dependent variable, income, is Z_{53}. This is a composite figure--a simple average of total earned income for the first year after the service and for 1965 (after adjusting both figures to comparable 52-week figures). Table 3.4 presents average income figures for the ten occupational groups (including infantrymen).

TABLE 3.4

Average Income by Occupational Groups

	Average Annual Income (Z_{53})
Group 1 - Military Police	$5,710
Group 2 - Electronic Data Processing Machine Operarors	6,007
Group 3 - Operatives	6,071
Group 4 -- Communications Repairmen	6,266
Group 5 - Repairmen (Radio, TV, and Automobile)	5,796
Group 6 - Warehousemen	5,464
Group 7 - Esoteric Skills (e.g., Countermeasures Search Specialist)	5,865
Group 8 - Infantrymen	5,748
Group 9 - General Duty Soldier	5,271
Group 10 - Clerical, Financial, and Accounting Skills	5,850
All Groups -	5,836

Average annual income for the infantrymen fell somewhere in the middle of the range for the ten groups. Consequently, income for the infantrymen did not differ significantly from the average income figure for all groups combined ($5,748 versus $5,836). Ceteris paribus, it does not appear that non-infantrymen (those with military vocational investment) earned more than the infantrymen. Other factors, however, including those related to income, were not equal. In fact, infantrymen compared with the total group were less educated ($\overline{Z}_8 = 4.7$ versus 5.2 for total group), of lower ability ($\overline{Z}_{13} = 99.1$ versus 111.4 for total group), and younger ($\overline{Z}_{64} = 5.6$ versus 5.2 for the total group). To the extent that educational level, ability, and age are positively related to income, the income figure for infantrymen compares, ceteris paribus, even more favorably with non-infantrymen.

To bring the income relationship between the infantrymen and non-infantrymen into clearer focus, analyses of covariance tests were performed. This process entailed comparisons between income of the infantrymen and non-infantrymen while taking into account selected variables. In choosing selected variables, the intent was not to explain variations in income of the dependent variable (i.e., to maximize $\overline{R}^2$), but rather to isolate the effects of certain variables correlated with income. (This allowed the variables which test the hypothesis to depict more clearly their real effect).

The selected variables included all those from category (2) plus various combinations from category (3). Variables from category (2) were inserted to remove their effects upon income whereas variables from category (3) were chosen to allow for the appropriate analyses of covariance which would examine the basic hypothesis.

Regression equations were obtained for 19 different groups. These include:

(A) Each occupational group separately (group 9 was omitted since there were insufficient observations to be of significance) -- 9 sets of regressions.

(B) All ten occupational groups combined -- one set of regressions.

(C) All ten occupational groups combined, but excluding the infantrymen -- one set of regressions.

(D) Each group (excluding the infantrymen and group 9) pooled with the infantrymen -- 8 sets of regressions.

This procedure provided a set of regressions for each group separately (A), and each one of these (excluding the infantrymen) pooled with the infantrymen (D). In addition, we also had all groups together excluding infantrymen (C) and all groups together including infantrymen (B).

A key variable in testing the hypothesis is Z_{66} and also, of course, Z_{66} multiplied by specific independent variables. The variable Z_{66} is a dummy variable representing the existence of vocational training which has a value of one for all individuals except the infantrymen. Thus, when running regressions for each group separately (or all combined without the infantrymen), we did not include Z_{66} or Z_{66}multiplied by other specific variables. This variable was inserted only into the pooled regressions where, by itself, it represented an intercept effect, and multiplied by other variables it represented slope effects.

Two regression equations on selected variables were run for each of the 19 separate groups. The variables for these two equations are:

Equation 1 - All variables from category (2)

Equation 2 - All variables from category (2) plus Z_{60}

Six additional regressions were run for each of the eight groups pooled with the infantrymen (D) plus all the occupational groups combined, including infantrymen (B). These six regressions took the two basic equations above and added first the dummy variable Z_{66} (equations 3-4), and then combinations of the dummy variable, and the dummy variable times one of the specific independent variables inserted into equation 2 (equations 5-8). Thus, equations 3 and 4 are as follows:

Equation 3 = Equation 1 + Z_{66}

Equation 4 = Equation 2 + Z_{66}

Finally, equations 5-8 are as follows:

Equation 5 = Equation 2 + Z_9 and Z_{66}

Equation 6 = Equation 2 + Z_{12} and Z_{66}

Equation 7 = Equation 2 + Z_{15} and Z_{66}

Equation 8 = Equation 2 + Z_{16} and Z_{66}

Initial observation of these regressions indicated certain facts:

1. Adjusted $\bar{R}^2$'s were not large (the greatest was approximately .24) nor did they vary greatly from one regression to the next. The $\bar{R}^2$ for the regression on the infantrymen was somewhere in the middle of the range of the $\bar{R}^2$'s.
2. Each regression by itself was significant as indicated by its corresponding F-value. As a corollary, most of the t-values for the partial regression coefficients for each regression were significant.
3. Some of the partial regression coefficients (b_i) were large relative to the dependent variable in each corresponding group.
4. Among the groups, the means of some variables did not vary greatly whereas others did. There was a pattern, in that variables which were not directly related to the occupational groups did not vary greatly whereas the opposite was sometimes true for variables which were more a function of the particular group. For example, highest educational level achieved and GT scores (intelligence) were not directly related to the specific group.[1] The range of the means for educational level ran from 4.8 for Warehousemen (group 6) to 6.1 for Clerical, Financial, and Accounting Skills (group 10), whereas the overall mean was 5.2 (5 = high school graduate; 6 = 1 year college...). The range of the means for GT scores ran from 99.1 for Infantrymen (group 8) to 118.6 for Data Processors (group 2), whereas the overall mean was 111.4.

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[1] This is not true if the values of these variables were decisive in the placement of the individual in the particular PMOS group. However, the military does not appear to take educational level into account when placing individuals, whereas the cutoff point in intelligence level was relatively low for the occupational groups selected.

Variable Z_{60} (Are you working or have you worked since your military service in a civilian job that was related to your military vocational training?) proved to be directly related to the particular occupational groupings. The range of the mean for Z_{60} (this variable has a range from 0 to 6) ran from .5 for Infantrymen to 2.3 for Data Processors (group 2), whereas the overall mean was 1.3.

Following the procedure outlined in the previous chapter, F_1 tests were performed on the first two equations for each group, respectively, with the corresponding two equations for the infantrymen. This tested whether, for the two sets of variables, two regressions from different populations (one the specific occupational group and the other the infantrymen) differed significantly in intercepts, slopes, or both coefficients. These F_{1i} ($i = 1, 2$ = equation number) and their corresponding F.95 and F.99 are shown in Table 3.5

TABLE 3.5

F_1's Which Test for Differences in Both Intercepts and Coefficients

Group 1 versus Group 8	
$F_{11} = 0.9727$	F.95 = 2.12 F.99 = 2.85
$F_{12} = 1.145$	F.95 = 2.03 F.99 = 2.69
Group 2 versus Group 8	
$F_{11} = 0.8331$	F.95 - 2.14 F.99 = 2.90
$F_{12} = 0.795$	F.95 = 2.05 F.99 = 2.73
Group 3 versus Group 8	
$F_{11} = 1.373$	F.95 = 2.12 F.99 = 2.85
$F_{12} = 1.791$	F.95 = 2.03 F.99 = 2.69

TABLE 3.5 (continued)

Group 4 versus Group 8

$F_{11} = 1.177$ $F.95 = 2.14$
$F.99 = 2.90$

$F_{12} = 0.908$ $F.95 = 2.05$
$F.99 = 2.73$

Group 5 versus Group 8

$F_{11} = 2.1355$ $F.95 = 2.12$
$F.99 = 2.85$

$F_{12} = 1.840$ $F.95 = 2.03$
$F.99 = 2.69$

Group 6 versus Group 8

$F_{11} = 1.106$ $F.95 = 2.12$
$F.99 = 2.85$

$F_{12} = 0.948$ $F.95 = 2.03$
$F.99 = 2.69$

Group 7 versus Group 8

$F_{11} = 0.2692$ $F.95 = 2.14$
$F.99 = 2.90$

$F_{12} = 0.469$ $F.95 = 2.05$
$F.99 = 2.73$

Group 10 versus Group 8

$F_{11} = 1.110$ $F.95 = 2.12$
$F.99 = 2.85$

$F_{12} = 0.931$ $F.95 = 2.03$
$F.99 = 2.69$

All Groups Except Infantrymen versus Group 8

$F_{11} = 1.006$ $F.95 = 2.10$
$F.99 = 2.82$

$F_{12} = 0.989$ $F.95 = 2.02$
$F.99 = 2.66$

These F_{1i} values were not significant at the F.99 level, thus, it ca be concluded that the regressions for each occupational group did not diffe significantly from the corresponding regression for the infantrymen group.

This conclusion does not preclude the possibility that they might have differed significantly in slopes or the intercept term alone.[1] These possibilities are considered next.

A dummy variable (Z_{66}) was inserted in the pooled regressions (each group together with the infantrymen). The pooled regression, called Type B regression, was tested with each Type A regression (each regression separately) via the F_2 test to see whether the two equations differed significantly in slopes alone.

Equations 3 and 4 represent Type B equations. That is, they are, respectively, equations 1 and 2 with the dummy variable Z_{66} inserted in each case. The F_{2i} values ($i = 1, 2$ where 1 refers to Type B from equation 3 versus Type A from equation 1, and 2 refers to Type B from equation 4 versus Type A from equation 2) are presented in Table 3.6.

TABLE 3.6

F_2 Values to Test for Differences in Slope Coefficients Alone

Group 1 versus Group 8		
$F_{21} = 0.892$	$F_{.95} = 2.23$	$F_{.99} = 3.06$
$F_{22} = 1.035$	$F_{.95} = 2.12$	$F_{.99} = 2.85$
Group 2 versus Group 8		
$F_{21} = 0.954$	$F_{.95} = 2.26$	$F_{.99} = 3.11$
$F_{22} = 0.751$	$F_{.95} = 2.14$	$F_{.99} = 2.90$
Group 3 versus Group 8		
$F_{21} = 1.642$	$F_{.95} = 2.23$	$F_{.99} = 3.06$
$F_{22} = 1.828$	$F_{.95} = 2.12$	$F_{.99} = 2.85$

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[1] See Kuh, op. cit., pp. 116 ff.

TABLE 3.6 (continued)

Group 4 versus Group 8

$F_{21} = 1.160$ $F.95 = 2.26$
$F.99 = 3.11$

$F_{22} = 0.990$ $F.95 = 2.14$
$F.99 = 2.90$

Group 5 versus Group 8

$F_{21} = 2.501$ $F.95 = 2.23$
$F.99 = 3.06$

$F_{22} = 2.092$ $F.95 = 2.12$
$F.99 = 2.85$

Group 6 versus Group 8

$F_{21} = 0.937$ $F.95 = 2.23$
$F.99 = 3.06$

$F_{22} = 0.788$ $F.95 = 2.12$
$F.99 = 2.85$

Group 7 versus Group 8

$F_{21} = 0.253$ $F.95 = 2.26$
$F.99 = 3.11$

$F_{22} = 0.475$ $F.95 = 2.14$
$F.99 = 2.90$

Group 10 versus Group 8

$F_{21} = 0.925$ $F.95 = 2.23$
$F.99 = 3.06$

$F_{22} = 0.852$ $F.95 = 2.12$
$F.99 = 2.85$

All Groups Except Infantrymen versus Group 8

$F_{21} = 0.854$ $F.95 = 2.22$
$F.99 = 3.04$

$F_{22} = 0.732$ $F.95 = 2.10$
$F.99 = 2.82$

These F_{21} values were also not significant at the F.99 level.[1] It can be concluded from the F_2 test that the slopes of each regression for each group did not differ significantly from the slopes of the infantrymen group.

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[1] One exception is for Group 5 versus the infantrymen where significance

If any significant difference exists between any occupational group regression and the regression for infantrymen, it must be with the intercept term alone. That is, the regressions did not differ significantly when we tested the slopes of variables identical to both equations (F_2 test). However, when an additional variable, Z_{66}, which has a zero value for one group (the infantrymen) and a one value for the others was added, its effect could be interpreted differently than it would be for a slope effect. If that term is significant, it means that the level of the regression for the particular group is shifted up or down, depending on the sign of the coefficient for Z_{66}. That is, Z_{66} causes the intercept term for the regression for a particular group other than the infantrymen to be increased or decreased. This indicates that the effect of variables which are correlated with the dummy variable and differ between the two groups will be reflected through the intercept term.

The effect through the intercept term was particularly relevant in the examination of the hypothesis, since the correlation of the dummy variable (Z_{66}) with military vocational training was 100 percent. A significant value for this intercept term would have indicated that vocational training (and anything else with which the dummy variable is correlated and which affects the dependent variable) has affected the level of the dependent variable, after allowing for the other explicit independent variable for both equations.

The procedure for testing the significance of the intercept term was discussed in the previous chapter. We considered for a given pooled group a regression equation without the dummy variable (Type C) together with that same regression equation with insertion of the dummy variable (Type B).

This test, referred to as an F_3 test, is identical to a t-test on the Z_{66} term. This t-value tests the null hypothesis that β_i corresponding to Z_{66} = zero in the universe. Table 3.7 lists the corresponding t-values (for Z_{66}) = t_i (where t_i = the t-value corresponding to Z_{66} for the i^{th} equation, $i = 3, 4, \ldots, 8$).

TABLE 3.7

t-Values for Vocational Training

Equation	Variable	t-Value	b-Value
	Group 1 with Group 8		
3	Z_{66}	1.174	-203.636
4	Z_{66}	1.344	-233.767
5	Z_{66}	0.321	189.688
6	Z_{66}	1.146	-501.426
7	Z_{66}	0.864	-651.641
8	Z_{66}	1.589	-264.291
	Group 2 with Group 8		
3	Z_{66}	0.476	107.792
4	Z_{66}	1.031	264.008
5	Z_{66}	0.299	250.325
6	Z_{66}	0.717	394.597
7	Z_{66}	0.912	-1422.79
8	Z_{66}	0.276	- 93.022
	Group 3 with Group 8		
3	Z_{66}	0.153	- 28.362
4	Z_{66}	1.243	-250.137
5	Z_{66}	0.167	- 99.941
6	Z_{66}	1.105	531.579
7	Z_{66}	1.872	-1925.61
8	Z_{66}	0.678	- 180.152
	Group 4 with Group 8		
3	Z_{66}	1.122	275.034
4	Z_{66}	0.661	178.633
5	Z_{66}	0.313	392.120
6	Z_{66}	1.929	1333.49
7	Z_{66}	1.307	-2420.20
8	Z_{66}	0.536	202.662

TABLE 3.7 (continued)

Equation	Variable	t-Value	b-Value
Group 5 with Group 8			
3	z_{66}	0.513	96.269
4	z_{66}	0.568	111.193
5	z_{66}	1.172	- 699.537
6	z_{66}	1.350	715.378
7	z_{66}	1.122	-1167.48
8	z_{66}	1.996	529.663
Group 6 with Group 8			
3	z_{66}	1.397	- 264.458
4	z_{66}	1.392	- 264.743
5	z_{66}	1.346	- 800.395
6	z_{66}	0.052	- 26.405
7	z_{66}	2.022	-2290.77
8	z_{66}	0.820	- 220.09
Group 7 with Group 8			
3	z_{66}	0.596	- 135.296
4	z_{66}	0.658	- 150.252
5	z_{66}	0.916	- 789.293
6	z_{66}	0.489	279.902
7	z_{66}	0.851	-1319.93
8	z_{66}	0.226	- 70.885
Group 10 with Group 8			
3	z_{66}	1.428	- 299.900
4	z_{66}	1.188	- 252.505
5	z_{66}	0.198	128.752
6	z_{66}	0.781	403.847
7	z_{66}	1.049	-1237.89
8	z_{66}	0.868	- 249.342
All with Group 8			
3	z_{66}	1.328	- 190.500
4	z_{66}	1.592	- 230.622
5	z_{66}	0.421	- 194.747
6	z_{66}	0.580	221.475
7	z_{66}	1.439	-1083.70
8	z_{66}	0.742	- 150.403

Observation of these t-values for Z_{66} indicated the following:

1. Some t-values were highly significant.
2. For all groups combined, the t-value for Z_{66} (F_3 test) showed significance at about the 0.90 level (we did not find significance for all groups combined with either the F_1 or F_2 test).
3. For all groups combined, the value of the partial regression coefficient for Z_{66} was negative, at approximately 250.

The above facts indicated that, ceteris paribus, if an individual had vocational training, as opposed to not having it, he would be earning, on the average, about $250 less per year. This implies that, if anything, there was a negative return to the military's vocational training investment. This conclusion of a negative return from the military's investment did not seem reasonable.[1]

Table 3.3 indicates that there are two variables directly related to the hypothesis, Z_{66} and Z_{60}. Variable Z_{66} is a dummy ($Z_{66} = 1$ if the individual had vocational training, and $Z_{66} = 0$ (the infantrymen) otherwise). Variable Z_{66} was based on observed facts concerning the PMOS of the individual. However, Z_{60}, a subjective variable, was based on the individual's estimation of whether each of his post-military occupations was highly related, somewhat related, or not at all related to his military vocational training. Z_{60} assumed values from 0 to 6 for each individual.

A list of the mean values for Z_{60} for all groups is presented in Table 3.8.

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[1] In a related vein, Harry Gilman stated, 'My own work shows that veterans' earnings are no higher, and indeed are often lower, than the earnings of non-veterans of like age and formal education. This suggests that military training is useful primarily in military service." (Harry Gilman) "Military Manpower Utilization," in Defense Management, edited by Stephen Enke (Englewood Cliffs, N.J.: Prentice Hall, 1967) p. 254.

TABLE 3.8

Average Degree of Relation of Post-Service Civilian Job to Military Training

Group 1 - Military Police	$\overline{Z}_{60} = 0.789$
Group 2 - Electronic Data Processing Machine Operators	$\overline{Z}_{60} = 2.403$
Group 3 - Operatives	$\overline{Z}_{60} = 2.142$
Group 4 - Communications Repairmen	$\overline{Z}_{60} = 2.135$
Group 5 - Repairmen (Radio, TV, and Automobile)	$\overline{Z}_{60} = 1.347$
Group 6 - Warehousemen	$\overline{Z}_{60} = 0.725$
Group 7 - Esoteric Skills (e.g., Countermeasures Search Specialist)	$\overline{Z}_{60} = 0.793$
Group 8 - Infantrymen	$\overline{Z}_{60} = 0.520$
Group 10 - Clerical, Financial, and Accounting Skills	$\overline{Z}_{60} = 1.107$
All Groups	$\overline{Z}_{60} = 1.221$

As expected, $\overline{Z}_{60}$ for the infantrymen was the lowest value for all groups. It is worth conjecturing why it is as large as it is. Since the answer is a subjective one, misunderstanding may have biased the answer. For example, some individuals may have related their post-military occupation to any activity performed earlier, including former occupations or non-military training. Conversely, these individuals could have considered military training in a broader sense and thus answered affirmatively if they felt they were utilizing some of the benefits of military life per se.

For all groups combined, Z_{60} was somewhat significant, with a partial regression coefficient of approximately 30. Since Z_{60} has values from 0 to 6, this partial regression coefficient indicated that, ceteris paribus, an individual who spends all of his post-military time in a job highly related to his military vocational training earns \$180 more per year.

The conclusions for all the groups combined indicated a significant negative value for vocational training itself, but a significant positive value for vocational training if it were used. This is not necessarily a contradiction.

As noted above, the nature of the Z_{66} variable was such that it could only be inserted into the pooled regressions (each group plus the infantrymen). When inserted it would dichotomize the two regressions insofar as it served as a proxy for one or the other.

This situation did not hold for the Z_{60} value. Within any group by itself, or any pooled group, it can and did take on values between 0 and 6. Given a significant t-value for any group and a positive partial regression coefficient for Z_{60}, it can be concluded that for any of these groups an individual who apparently used his vocational training did, ceteris paribus, earn more than one who did not use his military vocational training.

The above interpretation is not clear with regard to Z_{66}. Variable Z_{66} is a dummy inserted to affect the intercept term of the regression for a specific group. If it is assumed that the specific group and the infantrymen group were identical, except for vocational training, only then can it be concluded that the partial regression coefficient for this intercept term reflected a difference in earnings for the two groups due to vocational training.

In neither of the above two cases (Z_{60} and Z_{66}) was it concluded that the income effect was due solely, or even primarily, to vocational training. It was only claimed that those who apparently used their vocational training (Z_{60}) or those who had training (Z_{66}) earned different incomes. This difference, however, is causally related to vocational training (Z_{60} or Z_{66}) and also to any other variable(s) that affects income and is correlated to Z_{60} or Z_{66}.

There is one major difference between the interpretation of the effect of variables Z_{60} and Z_{66}. Variable Z_{60} is a continuous variable which reflected the degree of application of military vocational training to post-service employment. We attempted to evaluate the effect of Z_{60} upon income among members of the same PMOS group. The partial regression coefficient obtained can be adjusted to estimate the benefits that might accrue (recognizing that this figure could be negative) from maximum utilization of military vocational training. This is not true for variable Z_{66}, which partitions two different PMOS groupings. That is, all members of a given PMOS group were compared with all members of a different group (infantrymen).

The partial regression coefficient for Z_{66} indicated differences in the level of earnings due to variables associated differently with the two groups. This additional feature was not, in any apparent way, true for variable Z_{60}.[1]

Therefore, the empirical observation that the effect of vocational training itself (Z_{66}) is negative did not allow the conclusion that, ceteris paribus, those who did not have vocational training earned more than those who had vocational training, simply because they did not have this training. The two groups may differ in certain respects for which we did not, and perhaps could not, allow. That is, there might be a positive income effect from having vocational training which is hidden by the observed figures. The base group of infantrymen may be different in certain respects from the other groups which positively affects their income.

If the regression of all groups combined (excluding infantrymen) is compared with the regression for the infantrymen, the above idea is borne out. The infantrymen are, on the average, younger, less intelligent (as measured by their GT score), and have less education. Yet, despite these facts, they earn more income than those from the combined group.

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[1] It may also be true that two partitions of the same PMOS group may have variables associated differently for the two partitions.

Either this base group is inappropriate for examining the hypothesis or, by design, we did not adequately allow for some of the differences in this base group. Some possible explanations follow:

1. Because of the type of infantry discipline, the nature of the duty, etc., the infantryman possibly benefits relatively more than others from military life per se.
2. The majority of individuals in the sample had some occupation(s) prior to entering military service. Perhaps a large number of individuals returned, after the service, to jobs they held previously. The composition of pre-military occupations for the infantrymen may possibly be different, as may be the impact of these jobs on career profiles, compared with the pre-military occupations for the non-infantrymen.
3. The criteria used by the military in allocating individuals to PMOS categories may be biased in favor of infantrymen.

Thus, two tentative conclusions emerge: (A) Intergroup homogeneity of the sample, and (B) intragroup vocational training income effect.

(A) There is no significant difference between each of the occupational groups and the infantrymen. When all occupational groups combined are considered, we find that the combined group differs significantly from the infantrymen only in the intercept term. But the significance is on the average only at the 90 percent level. Furthermore, the magnitude of the difference is not large when compared with the effects of other variables, such as age or mobility index. Finally, the direction of the effect is negative, which precludes inferring that military vocational training has a positive effect on post-military earnings. If there is any effect, it is negative.

In comparing occupational groups with the infantrymen, it cannot be concluded from the above that military vocational training is worthless and perhaps even economically harmful. It may be that the insignificance is a result of the nature of the sample which, by design, was limited to "first-termers" only. The individuals in the sample, because of their limited service, were eligible only for particular occupational specialties that required the least amount of training time.[1] The short duration of their service did not allow them to advance vertically within that occupational specialty. If a group of individuals who spent a longer period of time in the service and acquired more highly-skilled specialties or higher positions in the given specialties were considered, a positive gain from the military vocational training might be shown.

A large proportion of the sample (62 percent) were draftees. Furthermore, many of the enlistees would not have enlisted had there been no draft. Thus, most of the individuals in the sample experienced a disruption in their economic activity due to the military service. Why should it be expected that these individuals gain from a limited exposure to an institution they would have avoided of their own volition? In fact, the disruption may even put them at an economic disadvantage.

It may be that those who were drafted had better jobs prior to the service. If they can, and do, return to these pre-service jobs, then it might be expected, ceteris paribus, that those groups with the highest percentage of draftees earn the most income. Table 3.9 below indicates that the infantrymen group had the highest percentage of draftees, which might explain why infantrymen earned relatively high incomes.

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[1] This policy is, of course, rational for the military. The military expects some returns from this training. Obviously, the shorter the enlistment period, the less time there is for training and to realize the returns from this training.

TABLE 3.9

Percentage of Draftees by Occupational Group

	Percent
Group 1 - Military Police	59.3
Group 2 - Electronic Data Processing Machine Operators	65.8
Group 3 - Operatives	71.4
Group 4 - Communications Repairmen	52.6
Group 5 - Repairmen (Radio, TV, and Automobile)	31.1
Group 6 - Warehousemen	53.8
Group 7 - Esoteric Skills (e.g., Countermeasures Search Specialist)	72.7
Group 8 - Infantrymen	90.8
Group 9 - General Duty Soldier	62.8
Group 10 - Clerical, Financial, and Accounting Skills	62.9
All Groups	60.3

(B) Within given occupational groups there is a definite positive income effect accruing to individuals who pursue a post-service job that is related to their military vocational training. This positive income effect is true for the approximately 25 percent of the individuals in the sample who are in a post-service job related to their training in the military.[1]

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[1] We observed that, for the combined groups, a typical individual in a related civilian occupation would be earning $180 more per year than an individual in a non-related occupation. The implications from this observation alone are quite suggestive. Assume, for example, that this earnings differential will continue and that the private cost for this individual's investment was two months (length of training period) foregone earnings = $450/month, and that the investment cost for the military was twice that of the individual's private cost. We could conclude that, in approximately five years (this ignores the discounting factor), the typical individual would recover his costs, and in 15 years society would recover its costs.

The 25 percent figure refutes the hypothesis that the post-service occupation is independent of the military occupational specialty in which the individual served. That is, there is a definite correlation between military vocational training and both choices of post-service job and earnings in that job. The question is, what causes this positive effect? If it is due to military vocational training, then why are the other 75 percent not availing themselves of this opportunity, and why did we find no apparent benefit from vocational training when comparing each occupational group with the infantrymen (conclusion A)? In other words, are there differences between the 25 percent and the 75 percent that would account for this effect, just as there might be differences between the occupational groups and the infantrymen that would account for the lack of significance of vocational training?

Conclusions (A) and (B) are not necessarily mutually exclusive, and additional variables were inserted to further examine these conclusions.

Examination of Tentative Conclusions

To examine the two tentative conclusions (A) and (B) and to probe for additional patterns of relationships, the variables from category (4) were explicitly introduced for analysis. Included are those variables indirectly related to the hypothesis, but not yet examined (see Table 3.10).

TABLE 3.10

Variables Indirectly Related to Hypothesis

Z_2 =	Dummy variable	0 = The individual served only in one PMOS group. 1 = The individual served in more than one PMOS group. This individual had at least two PMOS numbers not in the same occupational grouping.
Z_3 =	That number of months in particular PMOS group (excluding infantrymen)	Actual value = 2 digits For Z_3 all non-infantrymen are given a value representing the number of months in the particular PMOS group, but this value is 0 for all infantrymen. Thus, Z_3 not only dichotomizes infantrymen from non-infantrymen, but weights the non-infantrymen according to length of PMOS service.
Z_4 =	Total months of active service	Actual value = 2 digits.
Z_5 =	Percentage of active service time in PMOS group	$Z_5 = Z_3/Z_4$. Z_5 is by design 0 for the infantrymen group.
Z_6 =	Race	0 = white 1 = non-white
Z_7 =	Component of entry	0 = draftee 1 = enlistee
Z_{10} =	Existence of pre-service occupation	0 = had no pre-service occupation 1 = had some pre-service occupation
Z_{11} =	Existence of pre-service job related to PMOS	0 = had no such job 1 = did have pre-service job related to PMOS
Z_{17} =	Type of enlistment	0 = draftee or draft-motivated enlistee 1 = true enlistee
Z_{18} =	Preference for vocational training	0 = had preference for a specific vocation upon entering the military and notified the military 1 = had no such preference
Z_{19} =	Military training in preferred area	0 = had military training in preferred area 1 = did not have military training in preferred area

TABLE 3.10 (continued)

Z_{20} =	Service in preferred area	0 = served duty in preferred area 1 = did not serve duty in preferred area
Z_{23} =	Post-service schooling	0 = had some schooling after service 1 = had no schooling after service
Z_{44} =	Long-range expectations	0 = expects to be in a different job ten years from now 1 = expects to be in the same job ten years from now
Z_{62} =	Overtime (index)	Z_{62} is a continuous variable with values which range from 0 to 3.
Z_{63} =	On-the-job training (index)	Z_{63} is a continuous variable with values which range from 0 to 6.
Z_{68} =	True enlistees who get training and serve in a field for which they show preference	1 = true enlistee with training and service in preferred area 0 = any other individual
Z_{69} =	Return to pre-service job	Z_{69} is a continuous variable and takes on values from 0 to 3 depending on the relative amount of time spent in a post-service job, which is one the individual had prior to entering the service

Twelve sets of regressions were run:

(1) Each occupational group by itself = ten sets.

(2) All occupational groups combined excluding infantrymen = one set.

(3) All occupational groups combined including infantrymen = one set.

The regressions for each of these 12 groups contained six independent variables regressed upon the dependent variable, income (Z_{53}). The six independent variables consisted always of the five from category (2) plus an additional variable from category (4). These five variables (educational level, GT score, number of post-service jobs held, age, and number of dependents) are related to income and hence were inserted in the regressions to remove their income effect. This procedure allowed the sixth variable, which is related to the hypothesis, to depict more clearly its true effect. For each regression the sixth variable was one of the 18 from category (4) listed in Table 3.10 plus Z_{60} and Z_{66}. These variables were inserted into regressions one at a time since, in many cases, they are highly correlated and thus would have introduced the associated problems of multicollinearity. The 20 regressions for each of the ten occupational groups plus the two combined groups are presented in Appendix G.

Analysis

At the outset, variable Z_3 is examined since it is an extension of Z_{66} (military vocational training). Variable Z_{66} related to conclusion (A); namely, that there is no significant difference between any occupational group and the infantrymen. Variable Z_{66} dichotomizes the sample into infantrymen and non-infantrymen by having a zero value for infantrymen and a one value otherwise. Variable Z_3 assumes finite values representing the absolute length of service time in an occupational group other than infantrymen. Unlike Z_{66}, Z_3 has substantive meaning within each occupational group. For each group, Z_3 tests the hypothesis: The benefit of any military occupational skill is independent of the time spent in that skill.

It was observed that, for the regression for the combined groups excluding infantrymen,[1] Z_3 is highly significant (greater than 99 percent level). Its effect is negative.[2] This indicates that, ceteris paribus, the longer the period of time that an individual spends in some occupational group while in the service (Z_3), the less he will earn in his post-service employment.

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[1] The infantrymen are omitted since Z_3 is not relevant for this group.

[2] Within occupational groups the effect of Z_3 is also negative whenever Z_3 is significant.

The above observation does not allow the inference that length of time spent in an occupational group is of negative benefit to its recipients. The effect may be due to some other variable(s) with which Z_3 is correlated. The only variable significantly correlated with Z_3 is total length of active service time, Z_4.[1] Z_4 is highly significant; its effect is also negative and of greater magnitude than that of Z_3.

Thus, it is not clear that the effect of length of service in a PMOS (Z_3) is negative. The magnitude of the effect of Z_4 suggests that if allowance could be made for length of service, the effect of Z_3 could possibly be positive. It is unlikely that the effect of Z_3 would be both significant and positive. The negative partial regression coefficient for both Z_3 and Z_4 does suggest a negative effect from the disruptive (or at least length of disruption) aspect of military life.

Variables Concerning Pre-Service Occupational Experience

It was previously suggested that occupational experience prior to military service may have a differential impact upon an individual's later economic activity. Three variables (Z_{10}, Z_{11}, Z_{69}) related to pre-service occupational experience, which contained data on occupation prior to service (Z_{10}), pre-service occupation related to the PMOS (Z_{11}), and data on whether the individual held a post-service job which had been held prior to active service (Z_{69}), were examined. The focus of this discussion centers upon the impact of these three variables upon conclusions (A) and (B).

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[1] This is expected since the longer one spends in the service, the longer he can spend in a given occupational group.

Z_{10} is a dummy variable which separates those with a pre-service occupation from the others. Most individuals (88 percent) had pre-service jobs. There was little variation in this percentage among occupational groups. Z_{10} (existence of pre-service job), overall, was highly significant ($t = 3.5$) and positively related to income ($b = 460$). Within occupational groups, this significant positive relationship was also observed. The positive relationship suggested that individuals were benefiting in their post-military economic life from their pre-service economic activity. This spillover suggestion was reinforced when it was noted that Z_{10} was not correlated with any of the other variables (age, GT score, etc.) used in this analysis.

Z_{11} is also a dummy variable which separates individuals with a pre-service job related to the PMOS of their occupational group[1] from the others.

Overall, Z_{11} (pre-service job related to PMOS) had a one value for 26 percent of the individuals and was significant and positively related to income. Among the occupational groups, $\bar{Z}_{11}$ varied widely; there was also considerable variation in the degree of significance of Z_{11} as well as the magnitude of its effect.

This variation of $\bar{Z}_{11}$ among the occupational groups strongly suggested that Z_{11} was functionally related to the nature of the occupational group. The relatively high percentage of individuals with PMOS numbers related to their pre-service occupations tended to negate the hypothesis that assignment of individuals is independent of their pre-service job. Is the percentage high because individuals, if they can, prefer such an area, or does the military take advantage of this pre-service experience and make assignments which utilize this stock of human capital?

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[1] Infantrymen are not considered an occupational group, hence Z_{11} equals zero for all infantrymen. Z_{11} was obtained by comparing the job description of any pre-service job with the description of the PMOS. The individual's military record provided this detailed information.

That Z_{11} is positively related to income, may explain why Z_{60} (post-service job related to military vocational training) is positively related to income, and may also explain why only a fraction of individuals ($\overline{Z}_{60}$) take a post-service job related to their PMOS. These explanations seem likely since there is a fairly consistent relationship among groups between the corresponding average values of Z_{11} and Z_{60}, between their corresponding t-values, and between the magnitudes of their corresponding partial regression coefficients (b-values).[1]

Variable Z_{69} may also be related to Z_{10}, Z_{11}, and Z_{60}. Variable Z_{69} is a continuous variable with a range of 0 to 3, depending on the percentage of post-service time which the individual spends in an occupation which he had held prior to the service. Z_{69} was, overall, significant and positively related to income. Among occupational groups, there was little variation in the average values of Z_{69}. There was some variation among groups in the significance of Z_{69} and the magnitude of its effect. This variation, however, in the t-values and b-values for Z_{69} did not compare significantly with the corresponding t and b-values for Z_{11} and Z_{60}. It thus appears that Z_{69} is not a function of the occupational group, or at least does not have the same type of functional relationship as does Z_{11} or Z_{60}.

It is not surprising that Z_{69} is positively related to income. A major inducement for an individual to return after the service to a job he held before it is expectation of earning higher than he could achieve in an alternative occupation. This individual probably reaps returns from his increased capital stock due to experience and on-the-job training while in the pre-service occupation.

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[1] To obtain a better understanding of the effects of Z_{11}, the sample was dichotomized, and separate regressions for those with Z_{11} values of one and for those with Z_{11} values of zero were run. The sample was also dichotomized on the basis of low or high values for Z_{60}, and separate sets of regressions were run accordingly. The regressions corresponding to these dichotomies answered many questions, especially those concerning the relationship between Z_{11} and Z_{60}. Analysis of the regressions on these and other dichotomies is presented in the following chapter.

It is worth conjecturing on the magnitude of $\overline{Z}_{69}$. Overall, it was greater than one. This indicates that individuals spend at least one-third of their post-service time in a pre-service occupation, or that more than one-third of the individuals spend all their post-service time in a formerly-held job. It is unlikely that the individuals who returned to formerly-held occupations used or benefited greatly from their military vocational training. This may account for the insignificant finding concerning military vocational training (conclusion A).[1]

For those individuals with pre-service occupations but with unrelated PMOS numbers, there may be a certain minimum transferable military vocational investment necessary to offset the gain that otherwise accrues from returning to a pre-service job. The investment concomitant with the PMOS numbers in the study sample may not be large enough or of the type to overcome the gain from returning to a pre-service job.[2]

Variables Related to an Individual's Volition at the Time He Entered Military Service

Six variables, Z_7, Z_{17}, Z_{18}, Z_{19}, Z_{20}, and Z_{68} were introduced for analysis. Respectively, these variables provided data on component of entry (Z_7), type of enlistment (Z_{17}), individual preference for vocational training at time of entrance to service (Z_{18}), training in that preference (Z_{19}), service in that preference (Z_{20}), and "true enlistee" who receives training and serves in area of preference (Z_{68}).

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[1] A closer examination of Z_{69} among the regressions for the various dichotomies is presented in the next chapter. This should help resolve some of the above questions concerning Z_{69}.

[2] The Pentagon has very recently launched a program called Project Transition. This project is aimed at giving individuals a marketable skill before leaving the service. Initial experience indicates that 60 percent of these individuals desire additional training before leaving the service. Washington Post, August 5, 1967, p.1.

An overall 41 percent of the individuals in the sample were enlistees ($Z_7 = 1$). The percentage of enlistees does not vary much among the occupational groups except for group 5 (TV and automobile repairmen) for which it was 69 percent. Overall, component of entry was significant at the 88 percent level, with enlistees earning less income.

Within occupational group Z_7 is highly significant only for group 3 (craftsmen), in which enlistees earn considerably less than draftees ($582 per year). This difference might have been due to some variation between draftees and enlistees in group 3. For example, a larger percentage of draftees may have been craftsmen prior to military service. In this context, it is relevant that the percentage of draftees in group 3 (71 percent) was among the highest of all the occupational groups.

Variable Z_{17} designates enlistees who would have enlisted in the absence of selective service, called "true enlistees." True enlistees comprised 23 percent of the sample. This represents slightly more than half of all enlistees. Variable Z_{17}, overall, was significant at the 93 percent level and was negatively related to income. This negative relation of Z_{17} to income indicates that true enlistees earn less than all other individuals.

Within occupational groups, Z_{17} was most significant (92 percent level) for group 3. A true enlistee from group 3 (craftsmen) earned, on the average, about $600 less per year than the rest of the individuals.

Variable Z_{68} distinguishes the true enlistee who received training and served duty in a vocation of his preference. We might expect, ceteris paribus, a greater tendency for these individuals to use that skill and reap the income effect. Twelve percent of the total sample were in this category. Since 23 percent of all individuals were true enlistees, a little more than 50 percent of the true enlistees received training and served duty within their vocational preference. A larger percentage of true enlistees received training and served duty in a vocation of preference than the remaining individuals (see discussion below for Z_{19} and Z_{20}). This fact suggests that true enlistees have higher expectations of acquiring and benefiting from a militarily acquired skill than the others in the sample.

Overall, however, these expectations were not realized. Variable Z_{68} was significant at the 82 percent level and had a negative effect upon income. The level of significance and magnitude of effect were almost identical to that of Z_{17} (true enlistee) for the entire sample. Thus, there seems to be the same negative effect for any true enlistee as for a true enlistee who had training and served in a vocation of his preference while in the military.

Within occupational groups, no pattern emerged concerning Z_{68}. As a percentage of true enlistees, $\overline{Z}_{68}$ (true enlistees who received training and served in a preferred military vocation) varied widely. In this context, the fact that $\overline{Z}_{68}$ for group 3 was very small (5 percent) may explain why there was a negative effect from being an enlistee or true enlistee for group 3. Many individuals might have enlisted to acquire electrician or carpenter skills in the service, but their wishes were thwarted. Perhaps the military considered it too expensive to train individuals for these skills, and instead drafted individuals who had these skills.

To extend the above discussion, consider variables Z_{18}, Z_{19}, and Z_{20}. Variable Z_{18} separated individuals with a preference for a vocation at the time they entered service from the others. An additional condition was that the military be notified of this preference. Overall, 47 percent of the sample indicated such a preference. Among occupational groups there was much variation in this percentage. Individuals had decided preferences for certain occupations (e.g., data processors, 67 percent; TV and automobile repairmen, 56 percent), whereas they had little preference for other occupations (e.g., warehousemen, 28 percent).

Overall, Z_{18} was not significant, although it was highly significant for two groups, group 3 and group 5. For group 3 (craftsmen), those who had a preference earned decidedly more ($481 per year), whereas individuals in group 5 (TV and automobile repairmen) who had a preference earned decidedly less ($667 per year). These effects tended to cancel each other and render overall insignificance for Z_{18}.

This difference in the effect of Z_{18} for groups 3 and 5 is possibly explained by other variables. A much smaller percentage of individuals in group 5 had a pre-service job related to their military vocational training compared with individuals from group 3. Furthermore, a much smaller percentage of individuals in group 5 than group 3 returned after the service to a pre-service job. This suggests that perhaps a larger percentage of individuals in group 3 had such a preference precisely because they had this job before the service. Thus, much of the positive preference effect for individuals from group 3 may be due to their pre-military occupation experience.

First, not all of the individuals in group 3 who indicated a preference received training in the area of preference. For those who did receive such training, it had no significant effect upon income. A large negative effect, however, was attributable to individuals from group 5 who were trained in an area of their preference.

Second, a much larger percentage of individuals from group 3 had a post-service job related to their military vocational field, compared with individuals from group 5. Moreover, Z_{60} (post-service job related to military vocational training) was highly significant, and its effect was large for group 3. (An individual from group 3 in a highly-related job all of his post-service time would earn $780 more than an individual in a non-related job.) Variable Z_{60} was not significant for individuals from group 5.[1]

It might be that those individuals from group 5 who had less skill at the time they entered the service anticipated acquiring training while in the military. TV and automobile repairmen require skills that pay relatively well and are of a type for which individuals could be expected to request training. However, expectations of acquiring these skills were not realized.[2] Either they did not receive adequate training (CF-Project Transition p. 51), or they could not obtain a comparable civilian occupation. Even if they did obtain a related civilian job, there was no indication of economic benefit from military vocational training.

This negative income effect correlated with having received training in a preferred area was found for the overall sample. For the total sample, 35 percent had training in a preferred vocational area, whereas 37 percent served in a preferred vocational area. However, since training (Z_{19}) was significant overall whereas service (Z_{20}) was not, this suggests that the composition of individuals differed somewhat in these subsets.[3] Within occupational groups, however, Z_{20} was highly significant for group 2 (data processors). 65 percent of the individuals from group 2 served in the field they preferred, even though only 52 percent had training as data processors. Z_{19} (having training) was not significant for group 2. This suggests that either some of the 65 percent did not require training as they had this skill already, or that experience is more valuable than training to a data processor. The same reasoning can apply to group 3 (craftsmen) as to group 2, since Z_{20} was also significant and Z_{19} not significant for group 3.

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[1] This observation of a positive income effect accruing to individuals in group 3 is reinforced when it is noted that the reenlistment rate for individuals from group 3 was the lowest among all occupational groups. See Appendix I.

[2] TV and automobile repairmen had the highest percentage of enlistees, 69 percent.

[3] This is evidenced by the partial correlation coefficient of .681 between Z_{19} and Z_{20} for the total sample.

In summary, close examination of these six variables does not tend to support the hypothesis that military vocational training is of economic benefit to its recipients.

Variables Indirectly Related to the Hypothesis

Four variables, Z_2, Z_5, Z_6, and Z_{23}, which are indirectly related to the hypothesis, were examined. They contained data on training in a PMOS other than the given occupational group (Z_2), percentage of active service time in the given occupational group (Z_5), race (Z_6), and post-service schooling (Z_{23}).

Variable Z_2 is a dummy which distinguishes individuals who served in some additional PMOS, different from the PMOS numbers of their given occupational group. Variable Z_2, in effect, split the sample into those who served all their time in their given occupational group from those who did not but, rather, spent some time in a different occupational group.

Variable Z_2 would indicate that spending all of the time served in a particular occupational group affects the individual's income, or that having an additional PMOS from a different occupational group is significant. To know the origin of the effect requires additional information. Variable Z_5, which measures percentage of service time in the particular occupational group, provided this information.

Overall, Z_2 was not significant. This implied that any income effect from a given occupational group was due to that occupational group and not to any other military occupation. This recognizes that Z_2 would also not be not significant if neither occupation had an effect on income. Among the occupational groups, Z_2 was significant and positively related to income only for the military policemen (group 1).

Overall, Z_5 was not highly significant and was negatively related to income. This negative relationship implies that the larger the percentage of service time spent in the PMOS of his occupational group, the less, ceteris paribus, the individual will earn. However, all individuals spent a few months of their total service in no PMOS, because basic training does not constitute a PMOS.[1] Variable Z_5 is, therefore, necessarily correlated to Z_3, the number of months in the occupational group. We observed a very significant negative relationship between Z_3 and income. Thus, the negative relationship between Z_5 and income is primarily related to the negative relationship between Z_3 and income.

Race

Variable Z_6 is a dummy which separates non-white individuals ($Z_6 = 1$) from white individuals. Overall, Z_6 was significant at the 94 percent level, with non-whites earning less income. This negative relationship of Z_6 to income does not necessarily represent discrimination. The regressions for the two groups in the next chapter dichotomized according to race are intended to shed more light on this question.

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[1] Despite this factor, most individuals spend the majority of their service time in their occupational group. The overall rate is 84 percent of time in service.

It cannot be said that a negative relationship between Z_6 and income was expected on the grounds that, ceteris paribus, such a relationship generally exists. This was because the non-whites in the sample were a special group. A much larger percentage of non-whites reenlist, compared with whites. The non-whites who do not reenlist, and hence are part of the sample, are those non-whites who probably had higher civilian expectations. Perhaps these expectations were high enough to warrant anticipation of a positive effect from Z_6 for this group of non-whites.[1]

In any case, the fact that relatively few non-whites do not reenlist probably accounts for the small percentage of non-whites in our sample. Overall, the proportion of non-whites is 4.9 percent. It is not statistically reliable to generalize from such a small number of observations.

Some of the occupational groupings were designed to examine specific questions related to discrimination. For example, consider the occupational groupings of craftsmen (group 3) and the warehousemen (group 6). It was hypothesized that the occupations (electrician, carpenter, etc.) represented by group 3 were characterized by restrictive unions, whereas the occupation represented by group 6 (teamsters) was characterized by an inclusive union. Ceteris paribus, a negative effect might be expected for Z_6 for group 3, and a positive effect for Z_6 for group 5. Z_6 was significant and positive for group 6, whereas it was not significant for group 3. Closer examination of the non-white sample for group 6 yielded some interesting results.

For group 6 there were only a small number (10) of non-whites. Of these, there were a few with post-service jobs as teamsters. They, however, were earning on the average significantly less than the average for other non-white individuals, because the average was raised by one non-white attorney who was earning significantly more than the other non-white individuals. These findings illustrate the caution that must be exercised in making interpretations from a small sample.

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[1] A further complication arose in that the percentage of non-whites among the 2,788 individuals who could not be located for interviewing was twice those who were successfully interviewed.

Schooling

Overall, 33.6 percent of the individuals in the sample had some post-service schooling ($Z_{23} = 0$). For the total sample, Z_{23} was significant at the 80 percent level and showed a positive relationship of schooling to income. That is, there was a positive income effect accruing to those individuals who had some post-service schooling.

One might expect that, ceteris paribus, those who are attending school would earn less income. However, the dependent variable, income, is an average income figure for the first year between active service and 1965. This income figure was derived by multiplying the given yearly income figures by 52 (number of weeks worked including paid vacation time). Thus, if an individual did not work, but went to school part of the year or any time between the first year out of the service and 1965, this schooling would only indirectly affect the income figure. Schooling would affect the income figure negatively if the individual could not attain as well-paying a job during the weeks he worked as he could if he were not going to school the remaining weeks. Schooling would affect the income figure positively if the income during the working period following schooling was higher due to some returns from schooling.

In addition, schooling, by design, could mean full-time schooling, part-time schooling, or taking correspondence courses. Perhaps many of those who attended post-service schools were not full-time students and, thus, did not suffer much loss in earnings. Finally, those who attended school after the service may have been the better educated, more intelligent, etc., and thus be expected to earn more.

Among the occupational groups there was much variation in the percentage of individuals who had post-service schooling. The percentage was highest for the data processors and those with clerical and financial skills. Individuals from these two occupational groups had the highest educational level and the highest abilities (GT score). The group with the lowest percentage of schooling was craftsmen, group 3.

Miscellaneous Variables

Three miscellaneous variables were inserted separately into the regressions for each group for closer examination. These three variables are: overtime (Z_{62}), on-the-job training (Z_{63}), and expectations ten years from the present (Z_{44}).

Overtime

Overall, Z_{62} (having worked overtime) was highly significant and, as expected, positively correlated to income. That is, those who worked overtime earned more income. There appears to be no pattern concerning Z_{62} among the occupational groups. The percentage who worked overtime varied little, and for most groups Z_{62} was significant and positively related to income.

On-the-Job Training

Overall, Z_{63} [having received on-the-job training (OJT)] was highly significant and positively related to income. That is, those who had OJT were earning more income.

Theory indicates that individuals who are receiving OJT should, ceteris paribus, earn less income (especially if this OJT is more of the general type as opposed to the specific). Our results are not necessarily a contradiction.

Theory does indicate that individuals who received OJT will earn higher incomes in periods subsequent to the training period (especially if their training were more of the general type). Some of the individuals may have received OJT during a period for which we did not consider earnings (i.e., prior to the service or some time between the first year after the service and 1965). A positive relation between having OJT and income would be expected for these individuals.

The positive effect of having OJT and income was most significant and greatest in magnitude for group 3, the craftsmen. A further probe into group 3 revealed that many individuals had post-service jobs which they held prior to the service. Many of these jobs involved formal on-the-job training, *and for 57 percent of these jobs, OJT was received prior to military service*.

The positive relationship between OJT and income may be due to other factors. There may be some systematic differences between those individuals who received OJT and those who did not. The sample is dichotomized on the basis of Z_{63} in the next chapter to further examine this point.

Expectations

Variable Z_{44} assumed a value of one for those individuals who expected to remain in their present job ten years from now and zero otherwise. Overall, 70 percent of the individuals expected to remain in their present job for the next ten years. These individuals are earning significantly more income than others in the sample. The percentage (70 percent) varied only slightly among occupational groups, was significant for most groups, and was always positively related to income. Dichotomies were formed on the basis of Z_{44} for further analysis in the next chapter.

CHAPTER IV. ANALYSIS OF TENTATIVE CONCLUSIONS

Some tentative conclusions and suggestive findings emerged in the preceding chapter. Complete analysis of the data, however, was hampered due to the aggregative nature of the regressions; that is, the sample was partitioned only on the basis of occupation. Within any group there was no way of separating, for example, draftees from enlistees and then observing the incidence of other variables within these two groups.

Ten selected variables were chosen. For each of these ten variables the total sample of 1,941 individuals was dichotomized on the basis of the value of that variable for each individual. For example, variable Z_6 represents race. The 1,941 individuals were partitioned into two mutually exclusive groups on the basis of Z_6 which separated the non-white from the white individuals. This procedure allowed regressions to be run separately both for the white and the non-white groups of individuals.

The ten variables were selected to help resolve some of the above tentative conclusions and suggestive findings. It was with this focus that these dichotomies were analyzed. That is, differences in the values of specific variables, the magnitudes of their effect, and their degrees of significance were examined between corresponding regressions comprised of individuals from the dichotomies. For example, in analyzing separate regressions for non-white and white individuals it was observed whether there was a different percentage of draftees for the white individuals, whether being a draftee had a varying effect upon income for the two groups, and whether the degree of significance of this effect for a draftee varied according to race.

For each of the twenty groups formed, regressions were run according to the format of the preceding chapter. That is, the first regression for each group contained the six basic independent variables $[Z_1$ (intercept term), Z_8, Z_{13}, Z_{43}, Z_{64}, and $Z_{67}]$ as well as the dependent variable Z_{53}. To each of these regressions, one additional independent variable at a time was successively added to these six basic variables. Twenty-one regressions were run for each of these twenty groups. These regressions exhausted all of the twenty variables considered in the preceding chapter.[1]

The ten selected variables, each of which dichotomized the sample into two partitions, are: Z_7, Z_{68}, Z_{11}, Z_{60}, Z_{23}, Z_{43}, Z_{44}, Z_{63}, Z_6, and Z_{13}. Respectively, they are as follows:

Z_7 = component of entry

Z_{68} = "true enlistee who receives training and serves in his field of preference"

Z_{11} = relation of pre-service occupations to PMOS

Z_{60} = relation of post-service occupation to PMOS

Z_{23} = post-service schooling

Z_{43} = index of mobility

Z_{44} = job expectations ten years from present time

Z_{63} = on-the-job training

Z_6 = race

Z_{13} = ability index

Results of the ten dichotomies are discussed below.

Draftees versus Enlistees

Corresponding regressions (i.e., they contain the same variables) of draftees and enlistees revealed the following differences.

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[1] Data from these regressions are presented in Appendix H.

Enlistees, as expected, were younger; consequently, they had less dependents. Moreover, since they had less pre-service time, they were less likely to have had any pre-service occupation and less likely to have had a pre-service occupation related to their military vocational field. In addition, the percentage of the latter (having a pre-service job related to PMOS) to the former (having any pre-service job) was less.

A much larger percentage of the enlistees had, at the time they enlisted, an occupational preference of which the military was notified. A much larger percentage of the enlistees was trained and served in the occupational field of its preference. However, a larger percentage of draftees accepted a post-service occupation related to their military vocational training. This comparison of draftees and enlistees corroborated an earlier suspicion; namely, that military vocational training did not appear to significantly affect an individual's post-service employment. Evidence for this point stems from the above observation concerning military vocational preferences; that is, the group (enlistees) with a higher percentage of preferences (which are fulfilled) is the least likely to pursue a post-service job related to this military vocational training.

Moreover, pursuing a post-service job related to military vocational training was significant and positively related to income only for those with the smaller percentage of military preferences (draftees). The draftees, however, were more likely to have had a pre-service job related to their PMOS, and having such a related job was significant and positively related to income only for the draftee.

The draftees were also more likely to return after the service to a pre-service job; however, returning to any pre-service job is also significant and positively related to income for the enlistee. This observation confirms another observation; namely, that pre-service occupational experience has a significant impact upon an individual's post-military economic life.

In addition, more draftees than enlistees received on-the-job training (OJT) for their post-service occupations; and this OJT was significant and positively related to income only for the draftees. Draftees also earned higher incomes than enlistees. The above findings are consistent with the inference of the preceding chapter that the positive relationship of OJT to income can be partially explained if OJT were received by individuals prior to military service and then utilized in post-service employment.

"True Enlistees" Who Receive Training and Serve in Preferred Military Vocation versus Others

The dichotomies here were (1) the group of individuals who were "true enlistees" and who received training and served in a preferred military vocation, and (2) the others. The former represents individuals who, at the time they enlisted, expected (at least *ex ante*) a positive net gain from enlisting and from being trained and serving in a preferred vocational area. *Ceteris paribus*, we would expect these individuals to benefit somewhat from the military. It is possible, however, that *ex post* this positive gain is not realized; that is, for some reason realization of this return is thwarted.

Observation of the corresponding regression equations rendered the following differences:

The "true enlistees" who received training and served in their preferred areas earned less than the others. Some of this difference is attributable to these "true enlistees" being younger and having less dependents than the others.

These "true enlistees" spent much more time in the military (there is a negative relationship between length of service and income). Also, fewer of these "true enlistees" had pre-service occupations and fewer had pre-service occupations related to their military occupational specialty. It seems reasonable that, since these "true enlistees" had less chance to learn from some pre-service job, they sought acquisition of some skill while in the military.

A larger percentage of these "true enlistees" received some post-service schooling. There was a significant positive relationship between having schooling and income.

As might be expected, a larger percentage of these "true enlistees" held post-service jobs related to their military vocational experiences. But Z_{60} (relation of post-service job to PMOS) was significant only at the 67 per cent level. Z_{60} did reveal, however, that any of these "true enlistees" who spent all their post-service time in a job highly related to their military vocational field do earn approximately $300 more per year. Furthermore, unlike the earlier observation for the craftsmen, it seemed more likely that this income benefit from obtaining a post-service job related to the individual's PMOS was due to the PMOS. This follows, since a much smaller percentage of these "true enlistees" returned after the service to a job they had held prior to the service. At any rate, a strong case to support the hypothesis that military vocational training was of economic benefit to these "true enlistees" could not be supported on the above evidence.

Individuals with Pre-Service Job Related to Military Vocational Specialty versus Others

Comparison of the corresponding regressions from the two groups -- (1) those individuals with a pre-service job related to their PMOS, and

(2) others -- revealed the following differences: Those with the pre-service related job earned significantly more than the others; they also were a little older and a little less mobile after the service. A much larger percentage of those with pre-service related jobs were draftees. Furthermore, being a draftee was significant only for those with pre-service occupations related to PMOS. The magnitude of this significance was large and positive -- more than $400 per year.[1]

Being a "true enlistee" was significant only for those without a pre-service related job. (These "true enlistees" earned less income per year.) Moreover, the "true enlistees" without a pre-service related occupation who were trained and served in a military vocational area of their preference also earned significantly less income per year. These observations tended to confirm the suspicion that the expectations of the "true enlistees" as a group were not realized. There was, however, as noted above, some gain to those few "true enlistees" who pursued a post-service occupation related to their military vocational field.

A larger percentage of the individuals with pre-service jobs related to their PMOS expressed a preference to the military for a particular PMOS, a larger percentage was trained in this PMOS, and a larger percentage served in this PMOS. These facts suggested that these individuals had pre-service jobs related to their PMOS, largely because they preferred to pursue a field in the military similar to what they were pursuing prior to the military. This seems both rational and reasonable.

The outstanding feature of these regression comparisons was that a much larger percentage of individuals with pre-service jobs related to their PMOS had a post-service job related to their PMOS. Moreover, being in a related post-service job was significant and positively related to income for those with pre-service related jobs and much less significant and negatively related to income for those without a pre-service related job. These facts strongly suggested that the positive effect accruing to those individuals with a post-service job related to their PMOS (conclusion B) was not due to the PMOS but rather pre-service experience.[1]

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[1] This perhaps explains why we observe a negative relationship between enlistees and income.

For those individuals without a pre-service related job, there was a very significant and positive effect from obtaining a post-service job that had been held prior to the service. Thus, these individuals (as apparently with the above individuals who had a pre-service related job) were not benefiting economically from military vocational training. They were, however, utilizing to their advantage the pre-service occupational experience.

It appeared from the above that individuals are less likely to use their military vocational investment if they had any pre-service specific type of investment from occupational experience.

Group with Large Percentage of Individuals in Post-Service Jobs Related to PMOS versus Group with Small Percentage

Two groups were formed on the basis of Z_{60}. Z_{60} measures the degree of relationship of post-service jobs to PMOS. Z_{60} is a continuous variable with a range from 0 (no job related to PMOS) to 6 (having a job(s) highly related to PMOS throughout post-service period). The members of one of the dichotomies all had Z_{60} values greater than two. We called this group the high transferability group ($\overline{Z}_{60} = 3.821$) as opposed to the low transferability group ($\overline{Z}_{60} = .182$).

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[1] It must be recognized that there might be some positive effect here from military vocational experience. This might result from the added experience gained while continuing in the military in an occupation similar to that held prior to the military.

Average income, $\bar{Z}_{53}$, was greater for the high transferability group. Individuals from this group were considerably less mobile after the service than the others. A larger percentage of the high transferability group were draftees, and a larger percentage had a pre-service occupation. The percentage of the high transferability group with a pre-service job related to their PMOS was considerably more (three times as great) than that for the low transferability group. Relatively more of the high transferability group had vocational preferences, were trained in these preferences, and served in these preferences. A larger percentage of the high transferability group expected to remain in their current employment ten years hence. A larger percentage of the high transferability group received OJT, and the magnitude of the effect of this OJT was greater than that for the low transferability group. Finally, a larger percentage of the high transferability group returned after the service to pre-service jobs.

These observations strongly reinforce the earlier contention concerning the post-service impact of pre-service occupational experience. The individual more likely to pursue a post-service job related to his PMOS was one who had a pre-service job related to the PMOS. Moreover, a larger percentage of the high transferability individuals had OJT and benefited more economically from this OJT. These facts tend to support the hypothesis that the positive income effect from OJT may be due largely to the timing of the OJT (i.e., the OJT is received prior to military service).

Finally, a larger percentage of the high transferability group were draftees. Since this greater percentage of draftees was from the group whose members were much more likely to have had a pre-service job related to their PMOS, the contention that the military may draft certain individuals because they had certain skills seemed more likely.

Group of Individuals with Post-Service School versus Others

Comparison of corresponding regressions for those individuals with post-service schooling and those with no schooling revealed the following: There was no difference in income between these groups. Those who attended school had a higher pre-service educational level and a higher GT score (ability). The individuals with post-service school were also more mobile. A larger percentage had military vocational preferences and were trained and served in these areas of preference. A larger percentage of those who did not go to school following the service returned to pre-service jobs.

Thus, those who attended school were better educated, brighter, more willing to move, more interested in making the most of the service (e.g., preference for military vocational field), and less willing or able to return to a pre-service job. Since those with schooling did not earn any more than the others, it was concluded that much of the earlier-observed positive income effect from schooling was not due to the schooling. It was rather due to a correlation of schooling with educational level, ability, and other variables.

Group of Individuals with One Post-Service Job versus Those with More Than One Job

Comparison of corresponding regressions for those individuals with only one post-service job and those with more than one job rendered the following differences: The individuals with only one job earned considerably more income and were a little older. A much larger percentage of individuals with one job were draftees. A larger percentage had a pre-service job and had a pre-service job related to their PMOS. A much smaller percentage attended post-service schooling. A larger percentage expected to remain in their current jobs ten years hence. The one post-service job for these individuals was much more likely to be related to their PMOS. More of these individuals received OJT. Finally, a much larger percentage with only one post-service job had returned to a pre-service job.

These observations tended to reinforce an earlier conclusion that pre-service occupational experience exerted a strong influence on post-service experience. This conclusion partly explains why the less mobile earn more income. They returned after the service to something they did prior to the service because they were better off economically by so doing. Since they were better off economically by utilizing their pre-service experience in their first post-service job, there was no reason to change jobs. That they persisted in their one job was evidence of their having gained economically by originally being in this job.

Group of Individuals Who Expect to Be in Current Job Ten Years Hence versus Others

Comparison of corresponding regressions for the group whose members expected to be in their current job ten years hence with those who expected to change jobs revealed the following differences: Those individuals who will remain in the same job were earning considerably more income. They were better educated, had higher ability, were less mobile, were a little older, and had more dependents. They were more likely to be white as opposed to non-white. A larger percentage had a pre-service job related to their PMOS and a larger percentage had a post-service job related to their PMOS. There was a significant and positive income effect from having had a pre-service job related to the PMOS only for the group who expected to remain in the same job ten years hence. A larger percentage of the individuals who expected to remain in the same job had OJT. For this group (those who expected to remain in their current jobs) only, OJT was significant and positively related to income. A larger percentage from this group returned after the service to a job they had held prior to the service.

The above observations reinforce many of the earlier findings. The beneficial impact of pre-service occupational experience upon post-service economic experience is again evident. It was precisely those individuals who benefited from their pre-service experience in their post-service employment who were content to continue this "occupational constancy." There was indication that these individuals were somewhat brighter and better educated. Data concerning OJT again tended to corroborate the earlier observation concerning the timing of the OJT.

Group with Large Percentage of Individuals with OJT versus Group with Small Percentage of OJT

Comparison of corresponding regressions from the group having much OJT ($\bar{Z}_{63}$ = 3.881) with the group with little OJT ($\bar{Z}_{63}$ = .565) rendered the following differences: Those with much OJT earned more income. They were less mobile. A larger percentage were draftees. A larger percentage had a pre-service job and a larger percentage had a pre-service job related to the PMOS. For those with much OJT, having had a pre-service job related to the PMOS was highly significant and positively correlated with income. The individuals earned on the average $433 more than the others. A larger percentage of those with much OJT pursued a post-service job related to the PMOS (Z_{60}) and there was a significant positive income effect ($360) from so doing. The effect of Z_{60} was only somewhat significant and negatively correlated to income for those individuals with little OJT. More individuals with much OJT returned, after the service, to a pre-service job.

A larger percentage of those with much OJT expected to remain in their present job ten years hence. This "occupational constancy" implied that some portion of the OJT was of the specific type.

The analysis of these two groups was in consonance with earlier findings. That is, those who had the OJT were individuals who were more likely to have had this OJT prior to the service and who would be benefiting from it in their post-service occupations. They were more likely to have been drafted, to have had a pre-service occupation, and to have had a pre-service occupation related to PMOS. These observations again emphasize the impact of pre-service occupational experience upon post-service occupational choice and earnings.

Group of White Individuals versus Group of Non-White Individuals

As indicated earlier, the sample of non-whites was relatively small and biased for several reasons. Thus, any generalization from the data must recognize these biases. Comparison of corresponding regressions for these two groups revealed the following: The whites earned significantly more income. The whites were of higher ability but had less education and were younger. A greater percentage of the non-whites were draftees. Approximately the same percentage of whites and non-whites had occupational preferences at the time they entered the military. A smaller percentage, however, of the non-whites received training and served in these preferred areas.

A much smaller percentage of the non-whites expected to remain in their present job ten years hence.[1] This observation is suggestive since it implies that the non-whites are not satisfied with their current jobs, and that they expect to change jobs in the future.

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[1] For those who do expect to remain in the same job ten years hence, there is no significant positive income effect as was observed for all other individuals.

The percentage of non-whites who had a pre-service job related to their PMOS was the same as for the whites. However, being in a post-service job related to the PMOS was much more significant and positively related for the non-whites. A non-white who was continually in a post-service job related to his PMOS would have earned, ceteris paribus, \$1,100 more per year. Thus, there seems a possibility that perhaps a small number of this select group of non-whites might have benefited from their military vocational training. The data do not allow any further probing of this suggestion.

Group of Individuals of High Ability versus Group of Individuals of Low Ability

For the overall sample, ability (Z_{13}) was significantly correlated with income. It was not clear what interactions there were between ability and other variables used in the analysis. To probe these questions, two partitions of the total sample were extracted. These two groups were those with GT scores above 120 and those with GT scores below 100. The high ability group had a mean GT score of 129.8; the low ability group had a mean GT score of 88.4

Comparison of corresponding regressions for these two subgroups revealed the following differences: As expected, the high ability group had a much higher educational level. An interesting observation was that differences in GT scores were significantly related to income for the high ability group but not significantly related to income for the low ability group.

A smaller percentage of the high ability group was, as observed earlier, non-white. A smaller percentage were draftees. A smaller percentage of the high ability group had military vocational preferences, training in these preferences, and service in these preferences. A much larger percentage of the high ability group attended post-service school. A larger percentage expected to remain in their present job ten years hence.

Obtaining a post-service job related to PMOS was not significantly related to income for the high ability group, but was positive and significantly related to income for the low ability group. Thus, there was some basis for believing that those who were to gain from military vocational training were more likely to be of low ability.

CHAPTER V. SUMMARY AND CONCLUSIONS

As intimated at various junctures throughout this paper, a definite pattern emerges concerning our findings. The important features of this pattern can be summarized as follows:

Analysis of the data supported the hypothesis that military vocational training has no positive impact upon an individual's post-service income. However, there was some evidence for three possible exceptions to this hypothesis:

(1) Some individuals (those with low ability) might be earning higher post-service income due to military vocational training.

(2) Some non-whites might be benefiting from their military vocational training.

(3) Some true enlistees who served in a preferred military vocational area might also be benefiting from their military training.

Allowing for these three possible exceptions, the above hypothesis cannot be disproved by our data.

The data do reveal a certain tendency which corroborates and explains the above hypothesis. There is a definite relationship between pre-service occupational experience, post-service type of occupation, and concomitant earnings.

Individuals with pre-service jobs related to their PMOS earn higher post-service incomes than other individuals. A larger percentage of those individuals return after the service to these related jobs so that they can accrue the returns from their pre-service investment. Individuals without a pre-service job related to their PMOS are also earning higher incomes if they return after the service to a pre-service occupation.

It follows that individuals who return to pre-service jobs unrelated to their military vocational training cannot be gaining economically from that vocational training. This contention is reinforced when we observe that these individuals are gaining economically by returning, after the service, to a job they held prior to the service.

It also follows that individuals whose military vocational training is related to their pre-service occupation cannot attribute observed post-service income gains to that vocational training (post-service income gains correlated with military vocational training similar to pre-service occupation). Most of the gains might have resulted despite the military vocational training.

Recognition of the future impact of pre-service occupational experience resolved the two tentative conclusions of Chapter III. These two conclusions concerned (A) intergroup homogeneity, and (B) intragroup income effect from vocational training.

Conclusion A indicated that there was no significant difference between each occupational group and the infantrymen. Consequently, there was no effect from having had military vocational training. Conclusion B indicated that, for some occupational groups, individuals who were pursuing a post-service job related to their military vocational training were earning higher incomes.

We could not infer from conclusion B that the income gain accruing to individuals in post-service jobs related to their military training was due to the military vocational training. Additional variables, however, were introduced in Chapter IV to further examine conclusion B. Of the additional variables, those related to pre-service occupational experience resolved the question concerning conclusion B.

These variables revealed certain facts concerning the individuals who were earning higher incomes in a post-service job related to their military vocational training (conclusion B). These individuals were much more likely to have had a pre-service job related to their military vocational training. They were also more likely to have returned after the service to a pre-service job, and to have had some general-type OJT in their post-service job. The expectation of these returns was another reason why individuals preferred to shun a post-service job related to their military vocational training if this vocational training differed from the pre-service job in which the OJT was received.

We observed also that a larger percentage of those with a pre-service job related to their military vocational field preferred to be, and were, trained in that field. This suggests that some of these individuals were in the particular vocational field because they were personally interested in this field. We also observed that a larger percentage of those with a pre-service job related to their military vocational field were draftees. This suggests that either the draftees are more likely to have had jobs corresponding to their military vocational fields or that the military, by design, drafts individuals with particular pre-service occupational skills and assigns them accordingly.

The above observations concerning the future impact of pre-service occupational experience indicated finally that military vocational training had little effect upon individuals' post-service earnings. What might have been a causal relationship of military vocational training to post-service income (conclusion B) proved to be only a correlation.

A possible explanation of the findings in this study may lie in the hiring practices of firms. Recent studies indicate that employers do not hire semi-finished workers. This may be due to (1) the cost of determining how to use these individuals, or (2) the cost of training them to become equal to internally-produced workers. At the same time, the seniority system encourages employees to continue on their previously set occupational ladder. If this is so, Project Transition may lead to increased utilization of military vocational training. Finally, one further step is the District of Columbia's program where qualified military policemen, in their last six months of obligation, may opt to join the D.C. police force in lieu of military service.

CHAPTER VI. COMPARISON OF FINDINGS WITH RELATED STUDIES

In recent years, the literature has been replete with discussions and studies which fall into the area of investment in human capital. These studies assume that not all of the economic capabilities of an individual are given at birth or some arbitrary age when he commenced to work. But, rather, the quality of the individual worker or his capabilities is largely developed via activities that have the attributes of an investment.

These investments, which can take such diverse forms as formal education, on-the-job training, better health, and increased knowledge of the labor market, are not trivial. Moreover, taking such investments into account helps explain various gaps in our knowledge concerning economic growth, structure of relative earnings, and the distribution of personal income.

Many economists, using various analytical approaches, have recently conducted studies in the area of human capital; for example, inter-country and inter-temporal comparisons (e.g., the work done by T.W. Schultz), inter-industry and inter-firm correlations, residual approaches (e.g., the work done by John W. Kendrick and Edward F. Dennison), and the direct returns-to-education approach (e.g., the work done by Burton A. Weisbrod and Gary S. Becker).

These economists have coped with various inherent difficulties in studying human capital investment, such as separating investment from consumption, determining appropriate rates of discount, and evaluating the worth to an individual from the option that a given investment allows for future investment in any sequential investment process, such as from primary through secondary to college education. These economists have also modified existing analytical approaches and, additionally, have generated new approaches. Gary Becker's work exemplifies this type of endeavor.

There has also tended to be some division of labor in studies of human capital investment. Thus, Burton Weisbrod, Lee Hansen, and Gary Becker have concentrated on returns to formal education; Jacob Mincer on returns from on-the-job training; George Stigler on returns from labor market information; and Selma Mushkin on returns from health investment.

Surprisingly, however, there has been little focus on the returns from military vocational training (both formal and on-the-job). Moreover, this lack of research attention exists despite huge outlays on vocational training by the military. In fact, the military's annual outlay to hundreds of thousands of individuals in over 2,000 courses is in excess of one billion dollars. Thus, by any quantitative measure the military establishment represents the country's largest single training institution. Furthermore, Biderman and Sharp, Clark and Sloan, and others have indicated the increasing convergence of military and civilian functions. In fact, of the 1.9 million enlisted men who left service from 1958-1964 more than 1.5 million had acquired skills which generally have some civilian counterpart.[1]

Thus, despite the huge military investment of a type where returns to the individual could be expected to accrue during the post-service period, there is a research gap by economists in this area. Such a void is reflected in a statement by the Assistant Secretary of Defense (Manpower) Norman S. Paul: "We have at the present time [1965] no comprehensive statistics on the extent to which these men [the 1.9 million referred to above] have, in fact, utilized these skills in civilian life."[1]

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[1] Norman S. Paul, Assistant Secretary of Defense (Manpower), "Military Manpower Policies," p. 302, The Manpower Revolution, Doubleday & Company, 1965, Garden City, N.Y.

This study is, of course, not the first to examine military manpower problems nor the first to use a longitudinal analysis of the military. In 1959, Eli Ginzberg (The Ineffective Soldier) examined the adjustment experience of individuals released from the military as unfit to continue in service during World War II. The special research interest in mental adjustment, the small size of the group studied, the type of data, and the techniques of data usage are significantly different from those of the present study. In another 1959 study (Ten Thousand Careers by Robert Thorndyke and Elizabeth Hagen), a mail follow-up survey of a group of Air Force veterans was designed to determine whether separatees at a given moment in time were using their training. The Retired Veterans, Biderman and Sharp, recently (1965) showed that careerists, even those with professional training, had difficulties adjusting to civilian life. The study was based on a detailed mail survey of career personnel both within and separated from service. Classrooms in the Military (Clark and Sloan) presented without regard for sampling a case for the actual and potential use of the military by veterans. The authors accepted the military's own appraisal of potential use, based on the relation of military to civilian occupation, from formal catalogs.

None of the above studies related to the military analyzed similar questions, or utilized a similar analytical approach to that used in this study. A study in the human capital area whose analytical technique is more in the direction of this study is Michael E. Borus's *A Benefit-Cost Analysis of the Economic Effectiveness of Retraining the Unemployed.* Borus obtained detailed data, including income, on a sample of 373 workers. He then compared this group with a control group by using multiple regression techniques. Borus did not take a snapshot picture of the utilization of retraining investment but, rather, considered the utilization over time by allowing for such factors as attrition.

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[1] Ibid., p.302

Two studies on transferability of military training do, to a limited extent, parallel this study. The first is *An Examination of the Transferability of Certain Military Skills and Experience to Civilian Occupations*, by Robert Brooks Richardson, in which he examined similar questions as this study, employing many similar variables. His sample consisted of Air Force officers and enlisted personnel who had returned to the civilian sector. Two officers and two enlisted occupational skill clusters were chosen. Richardson found some degree of transferance, especially for the more technical skills. He was vague in evaluating the impact of pre-service occupational experience. As in this study, he did not find achieved educational level to be very significant.

The second is a study for the Rand Corporation by John McCall and Neil Wallace entitled *Training and Retention of Air Force Airmen: An Economic Analysis.* This study was limited to 505 electronic specialists--a highly specialized group that received considerably more training than the typical individual in our sample. Their earnings are examined only at a point in time. No account is taken of any pre-service occupational or training experience. The authors make no attempt to weight the degree of transferability of the Air Force training. To them the transferance is simply an all or nothing situation which is not very realistic. In any case, given the degree of specialty of the occupational group and the length of training, their finding of a $600/year benefit from this training as compared to their control group does not seem unreasonable compared with the findings of this study.

It is felt that the nature and size of the sample, the sampling and survey techniques used, the nature of the data, and the technique of analysis make the results of this study valid, especially as compared to studies by others. In this sense, it is hoped that this study represents a contribution to the question of transferability of military training.

Appendix F

The Military as a Trainer: A Study of Problems in Measuring Crossover

by

Paul A. Weinstein

and

Eugene L. Jurkowitz

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Introduction

Problems of government employment continue to be of relevance for study by those interested in industrial relations and human resources. Especially vital is a study of the most pervasive as well as the largest manpower activity, the military.

This report is concerned with the impact of military manpower training on the individual. The economic benefits of military service might take either of two forms; general capital advantage, which would increase the marginal productivity of the veteral vis-a-vis the non-veteran, regardless of civilian occupation, and specific capital advantage, which is related to the set of occupations defined as having this capital as a component

This research is a part of a larger study which treats the military as a variable set and examines the impact of it on a set of dependent factors.* Whereas the purpose of this part of the study is to examine the partial effect of the military on the economy through the direct training system, the method employed may be useful in evaluating alternative training institutions.

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*This paper was supported by grants from the Ford Foundation and the United States Office of Education. It is preliminary to a larger study covering a wide array of topics.

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I. The Problem

A design was chosen to test the factors accounting for the utilization or non-utilization of skills acquired in the military. It was assumed that age at entry, education prior to service, region, and interest in the military for training purposes are significant in the utilization of particular occupational training. The age at entry was interpreted as an index of occupational attachment that varied inversely with transfer. Thus, draftees, who have traditionally been older than enlistees, were thought to make less use of their training. It was assumed that component of entry, independent of age, similarly varied inversely with transfer; that is, volunteers leaving the service, who had a wider selection of military occupations, would be more likely to apply their chosen experience. The veteran's interest in the military for training purposes as well as the relation of the military occupation to premilitary experience were both assumed to affect transfer positively, although not necessarily additively. Aptitude, education, and region are variables with a more complex impact on crossover. The set of variables used in the study and the hypotheses with respect to each appear in our forthcoming study.

Both prior research and casual observation suggested that the findings would indicate nontransfer of human capital and the reasons for nontransfer should be probed. Specifically, do the reasons suggest policy parameter adjustments on either supply or demand factors and, in turn, are the variables perceptual or existential?

II. Study Design

Basic to the overall study design is the idea of convergence of occupational structures. Setting aside activities or occupations which are purely military, another set of activities exists in the military which is obviously transferable to the civilian sector. As a consequence of technological developments in both the military and civilian employment sectors, the occupational structures have converged, with less emphasis on "people-killing" and more on technical, administrative, and service activities. The hypothesis, therefore, was the more alike the occupations, the greater the probability that skill would be transferred. This assumed that convergence is real and that capital holders would pursue the use of the capital and employers would accept and ascribe economic value to a veteran's experience.

The design then became fixed upon a categorization of military skills on the basis of apparent convergence (see Table 1). The ten groups reflect significant areas of the military training effort, yet a variety of occupations, employers, and prospects in addition to varying degrees of openness and trade influence.

We assumed, following custom, that the military may have a value (positive) abstracted from any occupational benefit that may accrue through the training.* For this reason infantry was chosen as a benchmark and a proxy for the military.

While it would be valuable to generalize results, we are unable to do this because of the self-selective nature of the military. The differences between the services are significant for such manpower variables as procurement and training.

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*We have no evidence on the sign or magnitude of the general capital effect as it relates to occupational or other groupings. It is unlikely to be invariant in the groupings chosen. In this paper benefits when conjectured could be negative or positive.

We opted to limit the analysis to the Army and the Navy, which substantially cover all reasonable occupational categories, and to consider only enlisted male noncareerists.

Time out of service was maximized, and it was assumed that utilization as a function of time would vary by occupational category, the constraint on time being the increased likelihood of response loss, hence potential bias in the sample.

As a consequence, the standby reserves were chosen for the defined population. This minimized the task of sample selection. In procedures to be described elsewhere, we sample, located, and interviewed the population. A telephone survey was chosen because of population characteristics, the nature of the questions asked, and the higher cost of data acquisition by other means. The response is shown in Table I.

The data for the study were derived from three sources, two of which are relevant to this report. The Army record was used to supply data on pre-employment education and work experience, aptitude and work experience in the military, and basic demographic data. In the survey, relations between pre-service and service experience were ascribed in dichotomized form, as were the relation between pre-service and post-service occupation, both primary and moon-lighting. These relationships were set on a three-point scale. The post-service occupations were not necessarily complete, but covered a maximum of three positions, including the first, current, and prior to current position. The occupations were coded according to the Dictionary of Occupational Titles (1966).

The specific problem discussed below, is part of the second stage of the analysis for the Army group. It is intended to illustrate the technique used as well as to illuminate the problem.

III. The Procedure for Analysis

While the impact of military training might take many economic forms, we concentrated on the differential effects of such training on adjusted annual income. The hypothesis was that investment in human capital in military vocational training fields increased post-military individual earnings. The ten occupational groupings referred to above were used to test this hypothesis. Each of ten groups (except infantrymen) represented potential streams of lifetime earnings in excess of the

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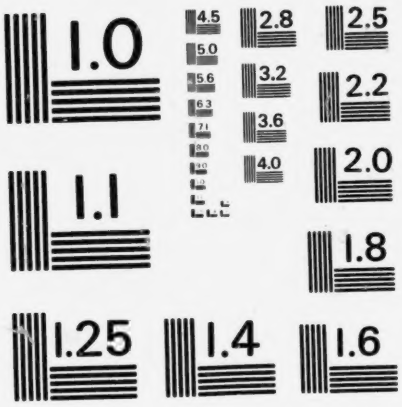

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MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU OF STANDARDS-1963-A

increment yielded by military life per se.

This hypothesis was first tested by analysis of covariance. In that stage of analysis, we compared the income of each occupational group with that of the infantrymen, cleansed of six independent variables: Educational level, number of dependents at time of exiting service, age, ability index, number of post-service jobs held, and relation of post-service occupation to military vocational training. Two conclusions emerged: (a) The differnnce between the occupational groups and the base group was nill, and (b) within an occupational group, income was positively related to occupational crossover. These conclusions are inconsistent if the military training caused the post-service earnings to expand. Alternatively, the response may be attributed to other variables which were correlated with (b).

The inconsistency was examined with additional explanatory variables. One set of variables involved premilitary occupational experience and raised the question of effects due to draftee versus volunteer mix. Draftees, as opposed to enlistees, are older and more likely to have had pre-service job experience at the time of in-

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duction. It was also observed that the infantry group contained the highest percentage of draftees. This data led to a test of the relation between pre-service occupational experience and post-military economic activity.

This hypothesis was examined for overall patterns by pooling all occupational groups. Then, the data was disaggregated for the ten occupational groups to clarify relations which may emerge from the aggregate.

Four variables directly or indirectly related to pre-service occupational experience used in the test are:

Z_1 = A dummy variable representing the existence or absence of any pre-service job. Coded 1 for affirmative and 0 for negative.

Z_2 = A dummy variable indicating the relation of the pre-service job to military activity. Coded 1 if related and zero if not.

Z_3 = A continuous variable ranging directly from 0 to 3 according to the percentage of post-service time in occupations held before the service.

Z_4 = A continuous variable ranging from 0 to 6. Summing the post-service experience weighted by time and the degree of ascribed relation

Table I. OCCUPATIONAL CLASSIFICATION, SAMPLE SIZE [a] AND RESPONSE Rate, 1966

	Career Group[b]	Number in Sample	Percent Interviewed
I.	Combat-Infantry	712	28%
II.	General Military - Duty Soldier	173	40%
III.	Police	478	45%
IV.	Electronic Data Equipment Skills[c]	209	55%
V.	Esoteric Skills[d]	179	55%
VI.	Radio, Radar, TV, and Auto Repair	504	46%
VII.	Trades Related to Telephone	160	49%
VIII.	Operatives-Construction and Repair	560	43%
IX.	Teamster and General Warehousing	218	38%
X.	Business and Service Activities	1,228	46%

a - Universe drawn from Standby Reserves, with indicated PMOS 2-5 years from active duty. (Non-career)

b- These are composed of series of occupations.

c - Operation and repair

d - High formal training on sophisticated military equipment to the military vocational training (0=no relationship; 1=somewhat related; 2=highly related).*

The test was performed with least squares regression lines on the then pooled groups and then separately for the various occupational groupings. Each of these four variables was inserted separately into four different regressions, in which the effects of the five independent variables had been nullified using the linear effect for the variable. The dependent variable, average annual post-service earned income, was adjusted to comparable 52-week periods. These four variables were inserted into separate regressions because of their relatively high correlation to each other and the consequent statistical problems associated with multi-colinearity and interaction.

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*$Z_4 = 3[\Sigma\left(\frac{R_i M_i}{M_t}\right)]$ $i=1, 2, \text{ or } 3$

R_i=0, 1, or 2; Relation of the i^{th} job to the service
M_i=Months in the i^{th} job
M_t=Months covered

IV. All Group Results

The corresponding means, partial regression coefficients, and t-value for each of the four variables is shown in Table II. We note the following:

1. Pre-service occupation was highly significant ($t=3.5$), positively related to income ($b=460$), and held by 88 per cent ($\overline{Z}_1=.88$).
2. For 26 percent ($\overline{Z}_2=.26$) military vocational training was related to a pre-service job, highly significant ($t=3.1$), and was positively related to income ($b=287$).
3. One-third of the post-service time ($\overline{Z}_3=1.0$)* was spent in occupations held prior to military service. This variable is significant ($t=3.6$) and positively related to income. The b-value indicated that income would increase $402 3 x $134) if all post-service employment were related to pre-service jobs.
4. This variable was significant only at the 80 percent level and was positively related to income ($b=29$). The b-value of 29 indicated

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*When referred to below b should be interpreted as (bZ_i).

TABLE II

The Magnitude and Significance of Four Variables Related to Pre-Service Occupation for Total Sample

5847 = Average Income

Variable	Mean	(b) Regression Coefficient	$t_{.95}=1.96$ t-value
Z_1	.88	460	3.5
Z_2	.26	287	3.1
Z_3	1.0	134	3.6
Z_4	1.2	29	1.3

that if all post-service time were in a job highly related to military vocational training, earnings would be increased by $174 more per year (6 x $29).

That individuals are benefitting in post-military economic life from their pre-service occupation was indicated by the positive relationship of Z_1 to income. This suggestion was reinforced when we observed that Z_1 was not correlated with the other variables (age, ability index, etc.) used in the analysis.

Two explanations for the high correlation shown in Z_2, between pre-service occupation and military vocational assignment are:

1. Individual preference for a related occupation.
2. Military preference for pre-service experience.

The positive relation of the variables to income is reasonable. The relation of military to pre-service employment, Z_1, points toward pre-military service as an explanation for the income gain. This is reinforced by Z_3, the distribution of post-service time in occupations related to pre-military activity. This is specially true for infantrymen where Z_1 was only significant at the 85% level, but the partial regression (b=628) was larger than the pooled groups. This may explain the lack of an income differences between the infantry and other groups.

The partial regression coefficients for Z_1 and Z_3 were approximately equal (b=400). The income effect appeared invariant to whether or not individuals pursue their pre-service activity; but veterans with related military vocational training (Z_2) had a reduced positive income effect compared with the other group, (b=287).

The joint effect of a pre-service job and related military vocational training (Z_2) was less than the effect of a pre-service job and no related military vocational training. This confirms our conclusion (a) that military vocational training was without economic benefit.

Despite this, a positive income effect was evidenced for individuals with post-service time in jobs highly related to their military vocational training (Z_4). This positive effect led to conclusion (b), although the magnitude of the Z_4 effect was relatively low compared with Z_1 and Z_3 (174 versus 400).

V. Disaggregation Results

Disaggregation at the level of the ten occupational groups yielded the results shown in Table III.

1. Pre-service job experience ($\overline{Z}_1$) varied little among the occupational groups. $\overline{Z}_1$ was significant and positively related to income as

TABLE III

Mean, Partial Regression, and t-value
for Four Variables by Occupational Groups

Occupational Groups[a]	Z_1			Z_2			Z_3			Z_4		
	$\bar{Z}$	b	t	$\bar{Z}$	b	t	$\bar{Z}$	b	t	$\bar{Z}$	b	t
I	0.9	628	1.4	---	---	---	1.1	28	.2	.5	25	.
II	0.9	566	.9	0.1	-1257	1.4	.9	30	.7	.7	-55	.
III	0.9	541	1.6	0.1	368	0.9	1.1	69.7	.7	.7	153	✓2.
IV	0.9	562.7	1.1	0.6	550	✓2.1	.8	-261	.7	2.3	-31	.
V	0.8	-314	.5	0.1	749	1.5	1.2	19	.1	.7	-13	.
VI	0.8	481	1.3	0.3	169	.6	.9	173	1.5	1.3	38	.
VII	0.9	1407	✓2.2	0.4	347	.6	1.3	406	✓2.1	2.1	79	.
VIII	0.9	-740	1.5	0.4	503	✓2.1	1.2	8.9	.1	1.9	131	✓2.
IX	0.8	121	.2	0.2	152	.4	1.1	90	.7	.9	-89	.
X	0.8	622	*2.8	0.2	-104	.5	.9	193	*2.8	1.1	-91	✓2.
Total	0.8	460	*3.5	0.2	287	*3.1	1.0	134	*3.6	1.2	28.5	1

[a] See Table I for definition of groups.
*significant to .99 level
✓significant to .95 level

observed in the aggregate.

2. The relation between military service and pre-military occupation showed considerable variety among the groups. The statistic, as in the total group, was positively related to income except in II and X and was significant.
3. Post-service time spent in pre-service occupations ($\overline{Z}_3$) also demonstrated little variation among the groups, and was both significant and positively related to income.
4. The proportion of individuals who accepted a post-service job related to their military vocational training (Z_4) was variant among the groups. Z_4 showed a positive relation to income, and was significant.

The problem of the relation of pre-military and post-military experience was broached by dichotomizing the total sample by Z_2 and Z_4 to observe the pre-service experience of these two groups. For Z_4, a continuous variable,arbitrary respondants were assigned to the non-transfer group if their value was 0-2.

The comparison of regressions from the two Z partitions revealed that those with a pre-service job related to military vocational training earned significantly higher incomes. However, they were also a little older and had fewer jobs. A higher percentage of veterans with pre-service related jobs were draftees; but draftee status was significant only for those with a pre-service related occupation. The relation of Z_2 to income for the group was large and positive -- more than $400 per year.

The regression comparisons highlighted that a larger percentage of individuals with pre-service jobs related to their military vocation had a post-service job related to their military vocation (Z_4). Moreover, being in a related post-service job was significant and positively related to income for those with pre-service related jobs and the reverse for those without a pre-service related job. Furthermore, individuals without a pre-service related job demonstrated a significant and positive income effect from obtaining a post-service job related to prior service. Thus, these individuals (similar to those who had a pre-service related job) are not benefitting but are using their pre-service occupational experience.

We dichotomized Z_4 at 2 -- the group that was 2 or greater was called the high-transfer group ($\overline{Z}_4$=3.8), and below 2, the low-transfer group ($\overline{Z}_4$=.18). Average income was greater for the former group -- more draftees than volunteers, with a high percentage of pre-service occupational experience. The percentage of the high-transfer group with a pre-service job related to their military vocation was three times as great as the low-transfer group. Relatively more of the high-transfer group had vocational preferences and were trained and served in these preferences. Finally, a larger percentage of the high-transfer group returned after the service to pre-service jobs (Z_3).

These observations strongly reinforce the argument of the previous section concerning the post-service impact of pre-service occupational experience.

Summary and Conclusions

It is unquestionable that little use is being made of service-related experience, but the cause is moot. While for some the mere association of an occupation with the military is noxious, this does not appear to be significant. Similarly, the argument that the experience is valueless would appear wrong. *Ex post* the experience is not deleterious nor is the training poor, unplanned, or ineffective. For methodological reasons, the explanation should be integral to economic analysis for relevance and to enrich the theory. This is possible in the case at hand.

In other phases of the study, we observed that a primary reason for non-transfer in all occupational groups was low pay, while the vast majority of those who had jobs related to their service indicated they had not received any economic advantage, either through pay or title, from their service experience. The explanation may lie in the hiring practices of firms. Recent studies indicate that employers do not hire semi-finished workers. Whether it is the cost of determining how to use these individuals or the cost of further training them to the level of an internally produced worker, there are costs which, at the margin, including the calculation of uncertainty, diminish the rate of return for a semi-employed veteran compared with the internally produced factor. At the same time, the seniority system encourages employees to continue with their previously set occupations, and discourage outsiders. Further, the training for this group may be below a minimum threshold level.

A major obstacle in this study is the tenuous design by which tasks are aggregated into occupations.

Despite efforts to identify occupations of respondents, the use of this data is of little significance. The difficulties lie in the categories per se. The degree of crossover and the direct monetary returns are continuous rather than dichotomous variables. Both at a moment of time and through time, transfer and benefits can vary in intensity. Thus, a descriptive variable to cover a period of time is difficult to produce and interpret.

This illuminates a general problem between data gathering and processing on one hand and analytical manipulations and analysis on the other. Whereas the technique employed in this study allowed one to design the data, it also created problems. The intensity of detail was bought at the price of significance. Our ability to collect and maneuver data is below our capacity to digest the surfeit of material.

Appendix G

OCCUPATIONAL CONVERGENCE AND THE ROLE OF THE MILITARY IN ECONOMIC DEVELOPMENT

by

Paul A. Weinstein

Prepared for

Explorations in Entrepreneurial History:
Essays in Honor of Harold F. Williamson

Introduction

Land and capital have had preeminence in studies of the Government's resource impact. Research on the United States or developing countries focuses on transport and extractive industries; or via agriculture, the public policy toward ownership and use of land; or via tax rebates, investment and physical capital. Largely untouched in the work on development is the area of human resources and the necessities of developed manpower for economic growth.

The thesis of this paper is that skilled manpower is a critical productive resource on a parity with all other real resources. Its deficiency, no less than the absence of markets or the shortage of funds and technological development, is significant in growth retardation. Manpower skills lurk beneath the assumptions concealed in "state of the arts" and "organization of society." The relevance

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of labor is obvious when human capital theory is infused into an analysis of development.

A theoretical basis for analyzing skill formation in development will be prepared and then attention focused on a producer of human capital: the military in both the U.S. context of the nineteenth century, and developing countries generally. Our evidence is casual because of significant data problems, our analysis preliminary, but we believe the implications are important for future analytical work, as well as studies in the dependence of growth on governmental activity.

I. Human Capital Production in Development

Business dependence on resources produced outside the firm is an indication, albeit complex, of the stage of economic development. Under some circumstances, the firm and economy are coextensive. Public services are produced privately and the extent of these services --- peace, protection, health, education "the social and technical environment" --- are determined by complex criteria which at least at the margin are economic.[1]

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[1] For example, in the company town the use of scrip implies a monetary authority for the closed economy.

The public sector is an "independent" economy adjacent to the private sector. This is of considerable interest because it produces "things" which are substitutes for the private sector output. The "things" and the substitution are linked to a distinction between general and specific capital.[2]

General (human) capital results from an investment raising productivity. However, an investor (excluding the person holding the embodied capital) cannot necessarily recoup the marginal income stream. Profit seeking enterprises, therefore, shun this type of activity. The investment in health, infrastructure projects, or non-process research are generally considered general. That is, the returns spread over a field precluding the collection by the investor of the productivity ascribable to the investment. Education normally is in this category because its productive power transcends firms, industries, and with migration-nations. Yet one sees firms providing education, i.e. the company town educating its population.

On the other hand, specific human capital raises the productivity for the investor which can be recouped. It is generally associated with a productive process as well as an investor. To the enterprise, public or private, the investment in human resources is the cost of locating, acquiring and putting on stream a person. The person may be pure labor, but normally is an amalgam of capital and labor. One criteria in hiring the labor is the level of capital he has held, either for its own sake, or because it directly affects productivity (through general capital), or as an indication of the job seeker's ability to digest additional capital.

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[2] Gary S. Becker, Human Capital. (New York, National Bureau of Economic Research, 1964), pp. 7-66.

Alternative investors to the hiring institution in specific or general human capital are the individual "job seeker," or some other institution; the state or another firm. For example, an individual in apprenticeship gives up income, i.e. earns less than his available market alternatives in the hopes of acquiring a higher planned stream of income. Or, communities to attract new firms and raise local GNP, invest in training an adequate workforce for a specific incoming firm.[3]

Whether an infrastructure, health, or education investment is specific or general depends on the state of the market and the political community. In the 19th century American company town, or larger geographic regions in say, Africa or the Middle East, all investment is firm specific. To the investor, creating technical and management skills is on a par with the development of other intermediate products. The necessity to fabricate the resource internally as opposed to purchase from the market, implies capital budgeting problems, a more concentrated industrial structure, and a twofold effect on technological change. The availability of skilled personnel affects the final output as well as the physical capital.[4] Of equal importance is the problem of the scale of activity, depending upon adequate supplies of personnel.[5] The alternative to production -- purchase -- depends upon the availability of the skills elsewhere.

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[3] Richard B. Morris, Labor in Early America. (New York, Octagon Books, 1965) passim.

One source of skill production has been the military for its own account. The military has had the longest experience in training in the public sector, generating investment in human capital with changing skill demands.

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[4] The technical complementarity and substitutability of human and non-human capital is the question at issue.

[5] Skill shortage is critical in the analysis of current economic problems, and particularly in development, but the infinitely elastic long-run supply of labor has disguised the relevance of the labor input in historical study.

While a large proportion of the force strength is actually, or potentially involved in "people killing," there has been of necessity a group concerned with non-combat. The United States, for example, shows a clear trend to services, management, and technical areas as shown in Table I. This is a crude indication of one possible source of skills for the economy from the military. The "generalness" of the skill to civilian applications depends on a number of variables, as does the actual transfer.[6]

II. Variables Influencing Occupational Transfer

The military sector's actual and potential impact upon the skills available to a developing economy are dependent upon two factors. First is the military manpower mix and includes decisions on the recruitment and maintenance of a sufficient force to accomplish the military missions. The second reflects the technological environment available to the military. Included in this category are the level of sophistication of the hardware and weaponry systems, and the standardization of hardware.

These two influences are treated as independent, but there are interrelations. For example, a complex weapons system cannot be employed by casual non-professionals, and alternatively, it may be imprudent to underemploy technical perosnnel on primitive weapons systems.

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[6] Charles H. Coates and Roland J. Pellegrin, Military Sociology: A Study of American Military Institutions and Military Life, (University Park, Md., The Social Science Press, 1965), p. 81.

Two secondary policy conditions must be accounted for prior to our full analysis. First is the nature of the military and its concept of the function it performs for the government or state.[7] The military establishment in its most limited form is a domestic peace-keeping force with an internal constabulary role, and, if isolated, the development of a sophisticated management and weapons systems would be pointless. This description substantially suits the United States' military policy up to the Spanish-American War, and even beyond.[8] A greater need for modernization follows from a defensive role if a hostile external force were matched for some minimal security level. Lastly, one assigns the military an instrumental role in an expansionist foreign policy. This requires that the techniques and manpower be superior to likely adversaries. Each assumption provides overriding policy direction for both manpower and technology.

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[7] S. E. Finea, The Man on Horseback, (Praeger, N.Y., 1962), pp. 3-71.

[8] The Indian Wars did not change technology or organization substantially. The Civil War is obviously not included.

A second gross variable in manpower transfer is foreign versus domestic supply. Foreign mercenary regulars and the importation of skilled military manpower for the pursuit of military objectives have uncertain potentials on the military's impact on the civilian economy. At one extreme there is the legendary case of the Hessians fighting the American revolutionaries in New Jersey, which would have had little impact either upon the economy of Great Britain or that of the colonies, save for the prisoners' desire to remain. On the other hand, the government of Ethiopia imports foreign military advisers to train and develop a military force which has substantial spillover potential. Another instance of this is Jordan, where British Army officers developed a professional and technical military staff which has influenced educational practices throughout the economy. The utilization of military mercenaries from abroad is an alternative to the utilization of the domestic mercenaries, and one expects that spillover and crossover effects are minimized by their use, but this requires a specification of the alternative supply sources.

These two overall strategies aside, the military's role in the potential supply of civilian skills can be stated in three manpower variables: the population commitment, the temporal exposure of the population in the service; and the components of entry into the military.

The population commitment, which is related to the utilization of foreign mercenaries, runs from the extremes of universal service encompassing both sexes, to highly limited, professional militaries which may be obligatory. The traditional model for the universal system is Switzerland.[9] There each male is required at age twenty to enter the service and following a training period is continuously returned to the military establishment through his adult life to age fifty. In Switzerland even the officer corps is largely part-time and is drawn from the normal civilian force. The length of service in each phase is designed to minimize the impact on the individuals and there is no effort to use the military for non-military activities.

A recent Swiss type model, yet one nurtured in a different environment, is Israel.[10] For Switzerland, the military mission is to establish a strong strike force so that any invader would reap no gains by an attack on the country. Israel has a defense-oriented economy and society fostered by three wars within two decades and a set of external foes. The population enters the military after high school, already prepared for military activities The universality of the service includes both sexes,[11] and is designed to change the overall availability of manpower through time. The length of exposure is also quite long. In a paramilitary organization like the Gadna, high school students are trained in military type activities and have performed various functions for the military. Subsequent to the full time service the reserve program is rigidly enforced, and individuals gradually slip from a role, say, as a direct combatant to one with limited civil defense activities. Israel designed the military as a device for homogenizing the population, and improving it through education, training, and health care.

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[9] Frederick M. Stern, The Citizen Army (New York, St. Martino's Press, 1957), pp. 155-174. Memorandum, Office Armed Forces Attache, Embassy of Switzerland, Release August 1967.

[10] Data on Israel is derived from interviews with officers of the Israeli Defense Forces in Israel.

At the other pole of population commitment lies the totally professionalized military. Most developing economies, as well as the United Kingdom,[12] have traditionally followed this model. Force strength size is set and policies adopted to acquire the force and minimize accessions. Typically the careerist retires with a pension. Population exposure to the military system is reduced, as is the manpower spillover effect.

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[11] There are prohibitions which preclude calling it a genuine universal system, particularly for females.

[12] Michael Foot, The Pen and the Sword, (MacGibbon, London, 1963), passim.

Variants on this and the universal model fill the continuum. For example, frequently countries have a manpower policy for officers to foster careerism and low turnover, while the non-officer cadre had considerable turnover and is non-professional.

These options stand behind the column heads of the temporal commitment policies shown in Table II. At one extreme are policies that lead the career person to retire and leave the labor force. This model is traditional and is generally marked by no reasonable forced retirement age. One would expect that the impact of the military would be minimal under these conditions.

Transferability is encouraged with early forced retirement. The current policy in the United States generally requires retirement after twenty years; and only those with high technical skills or demonstrated ability are retained for a longer period. A device to force the twenty years of utilization man is through the retirement pay system. Both officers and enlisted men reach the twenty year point in their late thirties or early forties. They have twenty or more working years ahead of them, and can pursue either a totally new career, or a career linked to jobs with some military attribute.

The non-career military are less professionalized but their competence depends upon continuing experience. For example, in Israel few individuals become careerists, and devote their full time activities to the military, but there is a continuing reserve obligation. Somewhat more restricted professionally is the non-career continuing limited obligation. After a period of full-time service the individuals face a period of reserve obligation, which is casual, part-time, and normally has lower technical demands. In the limited model, the temporal obligation is quite fixed. For example, in the United States all of those who are brought into the service have a six year obligation, and this is divided between a full-time military service, and a continuing reserve obligation. At the extreme is the non-career, non-continuing category. In this hypothetical case, individuals have a short obligation and not continuing requirement. This is approximated by the Soviet Union.

This temporal exposure varies from high training to low as one moves from left to right on Table II, while the exposure to civilian potential runs in the opposite direction. These are two dimensions of the military's impact.

The last major variable affecting the utilization is shown in the row headings in Table II. At one end is the volunteer force. This implies a military system with population requirements below a universal level. The volunteers may be either foreign or domestic. More developed countries tend to rely upon domestic personnel, but as in the case of the United Kingdom, former colonial affiliates do fill the cadre. The primary desire for service can be a response to immediate pay, and/or pay and benefits subsequent to discharge. Volunteers are divisible between the pure volunteer, the individual who would have volunteered without a compulsory system,and the draft-motivated volunteer who enlists to exercise specific options either for the branch of the service or occupation. United States advertisements to encourage enlistment point to military occupations open to the enlistee but unavailable to the conscript. These occupations invariably indicate relations to the economy which promise value in the long run. The military establishment entices individuals to learn something in the military and then use it subsequent to the military obligation. In the United Kingdom, however, there is no appeal whatsoever to post-military utilization of skills, only to combat activity.

The volunteer system is opposite the compulsory, and is at least part of the vehicle for obtaining manpower where military service is universal. A system of compulsion may be related to a volunteer system, as in the case in most countries, and this yields the mixed system. For the conscript, training is low and the compulsion further implies reduced transfer.

Technology along with these manpower policies affect the military's role in economic development. Concomitant with the more sophisticated military hardware is a growing emphasis on staff and service activities. Formally the bureaucracy and tasks of the military have moved to duplicate the civilian economy. This phenomenon is convergence, and can be viewed as either a priori or a postiori. Generally, scholars examine the hardware and the structure of organization in the military, and then observe the comparative developments in the civilian sector.[13] From this they conclude, after adding variables like education and technological sophistication, that there is a drive to make the civilian and the military occupations and activities indistinguishable. Alternatively, one can examine the specifics, that is, whether people from the military do, in fact, use their skills in the non-military sector. Longitudinal research like that of the Military Training Study are in this group.

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[13] This is referred to as interpenetration of the systems. The military's developing a modern organizational structure emphasizing staff functions has been a two way movement between it and the civilian sector.

In military organizations, staff work and considerable supply work have been performed by private parties following the military organizations. Thus, the current civilianization program is a throwback to the settler's wagon in U.S. history. To the extent that military functions are contracted out they do not necessarily involve the military in the flow of skills to the civilian economy. The policy of internal or external production of goods and services in the military is therefore critical to the impact that the military may have on the economy via manpower.

Apart from hardware sophistication and its impact on organizational requirements is the question of capital homogeneity. A large country and/or a country which is capable of producing its own supply of weapons faces a different problem than a country dependent upon external sources. In the United States, for example, our size as well as our productive capacity leads to considerable homogeneity in hardware. Systems are designed to be interchangeable and as a consequence of this assurance the training of individuals can be meager. The soldier is trained as a 'black box' mechanic, changing parts without necessarily knowing the basis for change. Alternatively, as in the case of Israel, or many developing economies, the military is forced to be supplied from foreign markets. This leads to supply instability both for political and economic reasons. Reinforcing instability in supply is the failure to manufacture one's own equipment because of resource limitations. Consequently the military must produce individuals who are trained quite broadly. There is a similarity between the training of the Israeli Air Force mechanic and the skills which are produced in the U.S. Navy training programs. The Israeli Air Force mechanic may today be working on a French Mystere, and in two years, a Swedish, English, or Czech substitute. In order to make the military a viable long-term force, his training must maximize adaptability. Similarly, anyone who is familar with naval forces recognizes that ships, even of the same type, are constantly being reworked, precluding uniformity of hardware. This results in training for a much broader based skill. In both cases, the individuals who received this type of training are better able to meet problems arising in the civilian sector. There he would be faced with nonstandardization of problems as well as materials, and therefore must fall back on his training.

Having examined both the technological and the manpower background of the role of the military on alternative economies, we turn our attention to an exploration of the impact on the United States and then other countries.

III. Military Manpower in the United States[14]

The citizen soldier has dominated the U.S. experience in utilizing military experience. Following British tradition and reinforced by the strong anti-military sentiments of the first President, the United States sought to play down the role of the military in the emerging country. Military force strength has been based on maintaining a wide reserve body in the form of a militia available for instant call. Under the federal system this has meant a significant role for the states in maintaining a military capability. In the main, this resulted in political leadership at the state level. The military was a form of sport and amusement rather than an effective operational instrument. Our geographic separation from Europe was the basis for a minimal requirement to develop a ready military system. Absence of threats from immediate neighbors and the general level of sophistication of armaments led to the denegration of the role of the military and its potential. It also implied low professionalism and skill formation.

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[14] The material for this section is taken from: Dupuy, R. Earnest, Men of West Point. (New York: William Slone Associates, 1951); Forman, Sidney, West Point: A History of the United States Military Academy, (New York: Columbia University Press, 1950); "The First School of Engineering," The Military Engineer, Vol. XLIV, 1952; Hiss, Forest G., Roads, Rails, and Waterways, (Norman, University of Oklahoma Press, 1957); Holt, W. Stull, The Office of the Chief of Engineers of the Army, (Baltimore: The Johns Hopkins Press, 1923).

The analytical schema developed above requires some primary observations. The non-commisioned officer cadre from the very beginnings of the country to recent times has largely been a career group with negligible skills. There was little staff work, and organization for the military system whose primary activity was in combat, as shown in Table I. The rewards to the military were low pay, bad rations, subsistance, and facilities for housing and medical care, particularly true up until the Civil War.[15] Life was relatively lonely in bases, removed from developed communities. Retirement on 75% pensions came after thirty years. It is not incorrect to say that the individuals in the enlisted cadre were not only from the bottom of the intellectual and educational strata of the developing country, but were deviants in terms of ambition, the view of law, and moral regard.[16] The picture of the soldier vividly shown in James Jones' From Here to Eternity is representative of both the literature as well as official reports of the permanent non-commissioned officer from its inception.[17]

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[15] *A Compendium of the Pay of the Army from 1785-1888*, Department of the Army, Washington, D. C., G.P. O., 1888.

The casual militia was organized along community lines for musters, other social occasions, as well as the larger encounters of the 19th century. Artisans were inducted and assigned to tasks requiring their skills, or the military used private entrepreneurs who sold their services. Until the first World War, the military had no need to develop a sophisticated training and occupational system, nor was the potential developed.

During the developmental and infrastructure periods in the 19th century the military system can be viewed largely as a net demander of skilled manpower. Whether under direct contract for specific periods of time, impressment or civilianization of military activities, the military sector reduced the supply of available skills to the private sector without any counteracting force, such as skill upgrading or initial training of unskilled labor.

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[16] Harold Wool, op. cit., p. 21.

[17] It is not surprising that the modern Army is sensitive to the popular notion of the military man as a civilian deviant. The attempt to alter this may be at the root of the military's reluctance at involvement in various social welfare schemes pointed toward upgrading disadvantaged sections of the population.

Counter to this experience is the history of the Navy. President Adams indicated that all attempts must be made to secure a professional force, and to that end authored incentives, both in terms of pay as well as appropriate living conditions. It may be the unique production function of a ship, where both the combat and production activities are inseparable that one developed a professionally competent workforce. However, in the non-officer category, young men were taken in at a fairly early age, and were moved along through progressive training until they became proficient seamen. Unquestionably the densely populated seacoast served as a ready supplier. Unlike the Army, the Navy upgraded labor, although through the use of the privateer, the Navy also reduced the supply of real naval facilities available to the rest of the economy. Little is known about the post-service lives of seamen, if they had any.[18]

In sharp contrast to the experience of the enlisted men is the history of the officer group. This is best done by examining the post-West Point and Annapolis careers of academy graduates. There are at least two useful dimensions in accounting for the military's impact. First is the direct impact, or the occupational activities undertaken by officers after leaving the service. A characteristic of this group is the time available to the civilian sector. It was noted above that officers, in the main, did not become careerists, but ended their military obligation shortly after graduation from the academies. Two forces were at work to maintain this throughout the 19th century. On one side, the Congress restricted the size of the military by specifying the numbers of officers and men. It also maintained a tight military budget. This meant that careerists had little chance of promotion given the loose retirement regulations along with low pay. While the officers were highly trained, they had little opportunity to apply their technical abilities because of budget limitations, and the bureaucratic control within the military. On the other side, the civilian economy was a strong magnet. In a period of great technical expansion, while railroads, canals, schools, and cities were being constructed, the talents for trained engineering personnel was high, particularly for the academy products.

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[18] The Navy does not consider it likely, but it has no proof.

The indirect effect of the military can be seen in the way in which technical education was modeled after the experience of the military academies. The nation's first engineering school was West Point. While established in 1802, West Point did not develop its impact until two decades later. During West Point's first years, admission standards were low as was course attendance. Only 71 individuals graduated from the Academy in the first decade and they received between a year and two years of irregular instruction emphasizing English, mathematics, engineering, and the sciences. Textbooks, as well as the Academy faculty, were at a fairly unsophisticated level even for the times.

Academy changes were started in the mid 1820's after the appointment of Colonel McRee to the Board of Engineers and Fortifications and a Major Thayer as Academy Superintendent. Both career officers had spent time in France and remodeled both the curriculum and the work mission of the military after the Ecole Polytechnique in Paris. A four year system of education with regular terms of instruction was in effect by the middle of the second decade. The faculty was organized into an academic board and regular examinations were required with an outside board of visitors. Established professors were brought in and the best cadets were used as Assistant Professors. Cadets were ranked according to performance and this affected their future role. A large emphasis was placed upon mathematics and engineering with both instruction and texts in French. The faculty had to be imported in the sciences, engineering and mathematics. This became the seed bed for the cultivation of engineers in the United States.

The best graduates, before returning to teach, studied advanced engineering and military subjects in Europe. For example, after his return from France, Mahan translated French engineering and mathematics books into English, and thus had a significant impact on technical education in the United States.

The second engineering school in the country, Rensselaer Polytechnic Institute, adapted the West Point model in textbooks and curriculum. Unlike most other universities they did not have West Point graduates on their faculty, but followed the West Point style. Generally, teaching and instruction were based upon the West Point model, and if not, conducted by West Point graduates. Some dimension of this can be seen in Table III.[19]

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[19] The columns represent the known picture, in those years, of the Academy graduates. Also shown are the number of Academy graduates over the time span indicated. Considerable double counting may appear in the 1890 and 1903 columns.

The numbers presented in Section II of Table III indicate the absolute number of West Point graduates in the field of education. To this one would add engineering taught as a secondary occupation. The graduates' impact is heightened by the strategic location. For example, when the Lawrence School of Engineering at Harvard was established in 1846, its first Dean and Professor of Engineering was Henry Eustis, a graduate of the Academy in 1842, and Eustis maintained this position until 1885. Other schools which figure in this same category are Union College in 1846; the Sheffield School of Engineering at Yale in 1847; and the School of Mines at Columbia. To a similar extent, the other professional fields were instrumental in the economic development of the United States. One need not belabor the importance of the various engineering categories both in terms of the development of the railroads, along with civil engineering, critical in the development of urban communities.

Besides the fairly documented West Point experience there are the graduates of other army academies such as Norwich, and certainly the significance of Annapolis graduates. This institution founded in 1845 also produced a large number of officers who served in our growing commercial fleet, as well as other activities surrounding trade and commerce.

In both teaching and engineering the impact of training in the military is obviously significant. Can another less specific function or general capital item be discerned? The strongest attribute of the officer is his ability to organize and direct large numbers of men in relatively complex and sophisticated operations. This experience was undoubtedly significant in areas as diverse as the law, then a largely unstructured profession, the government, as well as business and financial enterprises. The post-military careers outside of education had particular relevance to infrastructure development. The human capital produced in the military was what might be termed high-powered capital, instrumental in generating the investments required for sustained growth.

Edward Denison notes that some 24 percent of the growth in the United States was accounted for by capital formation of which human capital was not insignficant. In addition, another 20 percent of the growth was contributed by the advance of knowledge as interpreted broadly, including the impact of educational procedures, as well as Schumpeterian innovation, then the role of the military in the United States economic growth, may have been quite substantial. While it was impossible to say what percentage of military activity was used in post-service life, it is apparent that the military experience found wide use, and that the training was not without economic advantage. One is therefore led to discount the comment by Coates and Pellegrin:

> "Few former officers held legislative posts; only a small number held positions in public administration, in nationwide voluntary association of significant, or in business, industrial, or educational organizations. In short, the goals of the officer were comparatively few and largely limited to those of a military nature."[20]

The focus has been on the military impact through the utilization of personnel. We have not discussed another important area of human capital, the manpower management side of the military. Nor did we point to the military's impact in developing new techniques, tools, and methods of production in order to carry out programs of the Corps of Engineers. Evidence of the technological impact is fragmentary but indicates more study is required.

IV. Military Manpower in Developing Countries

The military's impact on the economic development of a country depends upon the exposure of the population and the time available after service. A significant implicit variable is the stage of development. The means of warfare and military organization may be too complex for an emerging economy to use the veteran's skill. An underdeveloped country, largely agricultural, and with low literacy, may find that the military person, accustomed to sophisticated machinery and organizational forms, is too rich an addition to the diet to be successfully digested. Therefore the stage of development, and particularly the nature of the military and the technical disparity of organization, influences utilization.[21]

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[20] Charles H. Coates and Roland J. Pellegrin, Military Sociology: A Study of American Military Institutions and Military Life. (University Park, Maryland: The Social Science Press, 1965.)

The military's potential in aiding economic development, and particularly providing real resources to individual enterprises (public or private) or whatever the decision-making units may be, is diverse. At one pole are countries with a totally professionalized career military. It is alleged that in Ethiopia the military drains off superior secondary school products.[22] Consequently, both the non-military public sector and the private sector have less skilled manpower that would be the case if the military followed an alternative procurement strategy. Both the

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[21] This is another form of the problem of the returning Ph.D. from the United States whose expertise outstrips the ability of the underdeveloped country to use it.

[22] Eli Ginzberg and Herbert A. Smith, A Manpower Strategy for Ethiopia. (Addis Ababa: July, 1966), pp. 16-33.

Ethiopian officer class and enlisted group find the military a reasonable outlet for their talents and offering adequate economic rewards. Generally, the military is the most westernized and developed sector of the economy. Like the early United States experience the officer and enlisted men serve until retirement and there is a minimal amount of second career activity. Where this pattern is broken, the individual might return to agriculture, or take up some form of petty trading, with little occupational crossover.[23]

The United Kingdom had a position not unrelated to the less developed countries. Traditionally, the officer group came from the lower echelons of the aristocracy. Commissions were purchased or obtained and held through influence. The officer group was professionalized and generally retired to activities appropriate to a leisure class rather than developing second careers. Ventures into the non-military civil service, or more likely politics, was in keeping with the tradition of the British officer group rather than trade or manufactures. This pattern has changed as the services become sophisticated, with a need for technical personnel who find a ready market for their talents. From both the extent of service and retirement policies, there is little evidence that the English enlisted cadre had, or is using, their acquired skill in civilian endeavors. The military may, therefore, be characterized as a drain on the activities of the country.[24]

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[23] Some commentators state that in Ethiopia desertion is not likely to result in criminal prosecution and punishment. Partly this reflects the high cost of apprehension, but it also reflects that the deserter, having been exposed to the military might be more valuable in society than in jail.

At the other end of the continuum lies Israel. The military, by design, has an educational and developmental role without peer. The educational system is enmeshed with the military, to supply both the required technical skills of a modern sophisticated army and navy, as well as develop a skill and management base for the rest of the economy. While having universal service for males and extensive service for females, it trains individuals from their late teens, and releases them from full-time active service after 24 to 30 months. Continuous military service, in the form of a legal requirement of thirty days service, maintains a high level of military preparedness and expertise with weapons and systems. The enlisted persons, upon discharge from the service, are directly put into a system that involves the Civilian Labor Market Service and the Ministry of Education. Thus, great efforts are made to ensure a high utilization of the investment. The military attempts to respond to employers who demand specific labor services and to develop training courses to affect transfer.

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[24] This is on the assumption of a fully employed model economy.

The Israeli military is led by a small group of professionals who were trained in the British military system. Their retirement has been at an early age, much younger than the United States, United Kingdom, or the Soviet Union, with the result that the management background and experience of the military is shifted into civilian activities. While some of these individuals lend support to other parts of the public sector, the career officers usually go to industry or other productive activity.

The recruitment of new officers, hence the potential impact of the military on the economy, is still greater. The normal recruit body produces the officer group. Thus, the primary input for officers are those who have completed their secondary education and are not college graduates. The military, therefore, is a vehicle for social and economic mobility. Based upon the leadership potential and measured intelligence, officers are chosen after they have completed some of their enlisted basic military training. They are then cycled through a training program and after on-the-job training undertake their military responsibility. While hard data is unavailable, discussions with the Israeli military indicate considerable occupational crossover. Difficulties arise in the economy's ability to absorb the rich supply, particularly where social policies discourage independent entrepreneurial activity.

An experience shared by many developing countries[25] including the United States in World War II, points to the military as a force in education and integrating the population. The integration process was carried on over decades in the United States but collapsed in Israel into a few years. The organization and education of diverse peoples, many of whom have standards and abilities far below the existing level of technology and organization, cause potential difficulties in the accelerated growth of an economy. Adjustment gaps appear in the inability of the incoming groups to obtain jobs and develop skills required in the host economy. The lower the level of technological military training. They are then cycled through a training program and after on-the-job training undertake their military responsibility. While hard data is unavailable, discussions with the Israeli military indicate considerable occupational crossover. Difficulties arise in the economy's ability to absorb the rich supply, particularly where social policies discourage independent entrepreneurial activity.

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[25] The President's Committee to Study the United States Military Assistance Program, Supplement to the Composite Report of the President's Committee, Vol. II, Annex D. "Contributions of Military Resources to Economic and Social Progress," (Washington: GPO), June 1959. The Draper Report, a study undertaken in the 1950's gives in some detail the experience of a large number of countries in terms of their civilian oriented manpower activities. For anyone wishing to pursue the subject, this would be an important starting place.

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[25] The President's Committee to Study the United States Military Assistance Program, Supplement to the Composite Report of the President's Committee, Vol. II, Annex D. "Contributions of Military Resources to Economic and Social Progress," (Washington: GPO), June 1959. The Draper Report, a study undertaken in the 1950's gives in some detail the experience of a large number of countries in terms of their civilian oriented manpower activities. For anyone wishing to pursue the subject, this would be an important starting place.

Countries which are dissatisfied at the growth rate of the past, and/or as Israel, subject to external pressures, must provide a vehicle and the military has been used. This occurs in military type counterinsurgency missions, as well as direct application in the human manpower sphere. The military has frequently gone into the education business, undertaking a role that could be performed by either enterprise or the non-military public sector. In Israel, military policy dictates that adults, those who are illiterate as well as those who have criminal records, be brought into service. Intensive work to raise literacy as well as provide some ideological substructure are part of military training. One can only conjecture as to the impact of this on the economic and military capabilities of Israel.

It would be naive to leave the discussion of the military's impact on growth without suggesting that underlying the potential utilization of the military in economic progress is the need to establish appropriate social and political typologies to explain the drive that broadens the military's interest, yet keeps it under civilian control.

Conclusions

We have explored some options open to a developing economy in producing its infrastructure of human capital. The military has been an alternative to either the public sector generally, and/or the private sector in generating both the education base and the range of specific skills, as well as addition to managerial skills. The developmental stage of both the civilian sector as well as the degree of sophistication in the military are most important, as is the spread between the two and suggests needs as well as barriers in the utilization of the skills. In an economy like the United States today, military personnel may find positions easily if their background is directly in an activity found in the civilian sector, but less so if training is required. That is, in a highly developed labor market it is apparent that firms are unable to utilize semi-finished labor inputs. Or, if the degree of spread is too large the civilian sector may be unable to digest the output of trained personnel.

What this paper suggests is a need to examine manpower requirements in military history as well as development strategy. This should not be sloughed off under some _a priori_ conceptions about the adjustment mechanism. Further, we should explore the relationship between civilian manpower and the manpower needs of the public sector in achieving its own end. There is much historical evidence to suggest that the military has been of some significance in development.

Whether developing economies should undertake to further develop this resource requires both political and economic judgments. We are not suggesting that the military is the most efficient means of producing skilled manpower, but that where development is low it may be a mere philosophic game to look for the best solution and the optimal allocation of resources. Rather as history has shown, systems tend to use the course of least resistance and to take advantage of existing opportunities. As long as there would appear to be a military based system, that is, that countries find it necessary to maintain a military force, it is only appropriate that one examine the possibility of using this to satisfy non-military goals.

TABLE I

PERCENTAGE DISTRIBUTION OF OCCUPATIONAL GROUPINGS OF ENLISTED MEN IN ARMED FORCES, CIVIL WAR TO JUNE, 1954

Occupational Groupings	Civil War[a]	Spanish-American War[b]	World War I[c]	World War II[d]	Korean Conflict[e]	June 30, 1954[f]
I. Technical and Scientific personnel	0.2	0.5	3.7	10.4	12.7	15.8
II. Administrative and Clerical personnel	0.7	3.1	8.0	12.6	18.1	17.1
III. Mechanics and Repairmen	0.1	1.0	8.5	16.6	15.3	18.3
IV. Craftsmen	0.5	0.1	13.0	5.9	4.7	6.0
V. Service Workers	2.4	6.5	12.5	9.6	12.4	12.1
VI. Operatives and Laborers	2.9	2.2	20.2	6.1	6.5	5.4
VII. Military-type-occupations (not elsewhere classified)	93.2	86.6	34.1	38.8	30.3	25.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Adapted from Report on Conditions of Military Service for the President's Commission on Veterans Pensions, Question IV, December 1955.

[a] Civil War Period covers only Army Personnel base of 1,908,800 total.

[b] Spanish-American War period covers only Army Personnel base of 246,410.

[c] World War I period covers only Army Personnel base of 3,665,000.

[d] World War II period covers all services base of 9,370,986. Navy and Air Force show no strength in occupational Group VI.

[e] Korean Conflict period covers all service base of 4,428,939. Navy shows no strength in Group VI, Air Force shows no strength in Group VII. Where no strength is shown in any of the groupings, the occupational structure in effect at that time permitted the placing of this type of personnel in other groups because of multiple duties or skills.

[f] Present period is June 30, 1954. Navy shows no strength for Group VI; Air Force no strength for Group VII. Base of 2,887,851.

TABLE II

PRIMARY MILITARY POLICY VARIABLES IN OCCUPATIONAL CROSSOVER

Component of Entry		Actual and Potential Temporal Attachment				
		Career Retire	Career Double Career	Non-Career Continuing Unlimited	Non-Career Continuing Limited	Non-Career Non-Continuing
Volunteer	Foreign					
	Domestic					
Compulsory						
Universal						
Mixed						

TABLE III

POST-SERVICE CAREERS OF WEST POINT GRADUATES 1867, 1890, 1903

Of the first 4,214 graduates of the United States Military Academy, the following is the "to-date" number of men in selected civilian careers:

	1867	1890	1903
I. POLITICAL			
President of the United States	-	1	1
Ambassador, Charges d'Affaires, Consul, etc	11	22	29
Members of the Cabinet	3	4	4
Members of the Senate and House of Representatives	12	21	24
Governors of States and Territories	5	14	16
Other State Government Officials	117	187	197
Mayors and City Officers	29	63	74
Total Political	177	312	345
Percentage of Total Grads	8.0%	9.2%	8.2%
Percentage of Total Known in Civilian Occupations	12.7%	14.1%	14.6%
II. EDUCATIONAL			
Presidents of Universities and Colleges	26	41	46
Principals, Regents, and Chancellors	28	45	46
Professors and Teachers	85	131	136
Total Educational	139	217	228
Percentage of Total Grads	6.3%	6.4%	5.4%
Percentage of Total Known in Civilian Occupations	10.0%	9.8%	9.6%

Table III continued

	1867	1890	1903
III. ENGINEERING			
Surveyor-General of States and Territories	6	10	11
Chief Engineer of States	14	14	14
Chief Engineer of Railroads and Public Works	48	61	63
Superintendent of Railroads and Public Works	41	59	62
Civil Engineers	155	217	228
Electrical Engineers	-	-	5
Total Engineering	264	361	383
Percentage of Total Grads	11.9%	10.7%	9.1%
Percentage of Total Known in Civilian Occupations	19.0%	16.3%	16.2%
[illegible]. BUSINESS AND FINANCE			
Presidents of Railroads and Other Corporations	35	77	[illegible]7
Banking Officials	22	46	49
Manufacturers	30	72	77
Merchants	78	121	122
Total Business and Finance	165	316	335
Percentage of Total Grads	7.4%	9.3%	7.9%
Percentage of Total Known in Civilian Occupations	11.8%	14.3%	14.1%
V. OTHER PROFESSIONS			
Judges	10	13	14
Attorneys	119	185	200
Physicians	9	12	14

Table III continued

	1867	1890	1903
OTHER PROFESSIONS, continued			
Architects	4	7	7
Authors	75	158	179
Total Other Professions	217	375	414
Percentage of Total Grads	9.8%	11.1%	9.8%
Percentage of Total Known in Civilian Occupations	15.6%	16.9%	17.4%
AGRICULTURE			
Farmers and Planters	161	228	230
Total Agriculture	161	228	230
Percentage of Total Grads	7.2%	6.7%	5.5
Percentage of Total Known in Civilian Occupations	11.5%	10.3%	9.8%
TOTAL NUMBER OF MEN GRADUATED FROM THE U.S. MILITARY ACADEMY	2218	3384	4214
TOTAL KNOWN IN CIVILIAN OCCUPATIONS	1393	2217	2371
PER CENT OF TOTAL IN KNOWN CIVILIAN OCCUPATIONS	63%	66%	56%

Sources: The Centennial of the U.S. Military Academy at West Point, N.Y., 1802-1902.

Cullom, G.W. Biographical Register of the Officers and Graduates of the U. S. Military Academy, 1868, Vol. I; 1879, Vol. I, 1898, Vol. III.

Appendix H

REGIONAL IMPLICATIONS OF THE POST-MILITARY ACTIVITIES OF VETERANS

by

Paul A. Weinstein
and
William B. Clatanoff, Jr.

Paper for the Southern Economic Association
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The relation of military-civilian manpower activity and regional economics is as yet unexplored. In those infrequent periods of peace, a flurry of interest is observable on the impact of the military on local areas. Primarily, this concern relates to the regional distribution of the military's hardware procurement. It is only where there appears to be a potential disaster, as in the closing of a Navy Yard, that we find any concerted effort of the military into the civilian employment effects of its policies. The military's dimension of concern is the budget allocation within the local public sector, the financial sharing of expenditure burdens, and the shocks attendant to changes in the level of military and civilian employment in a specified geographic area. These areas are, of course, relevant subjects for economists, but we explore the manpower analogue to the hardware problem. It has been found that the military as a trainer, an investor of human capital, has an impact on civilian employment which is not invariant to space. We examine the regional implications of flows into and from the military.

Our concern is with the network of relations that may exist between the spatially located supply of persons to the military and the differential impact, if any, of military training on returning veterans as a function of region. There is little doubt that changes in military manpower levels or methods of procurement should have some significant effect upon the local availability and/or imbalance of skills.

Section I. Evidence and the Regional Problem

Regionality has implicitly arisen in an earlier paper produced by the Military Training Study.[1] That paper examined the impact of specific military occupational training on the level of income received in civilian employment by veterans. Our concern was whether people benefited financially as a result of having received this training. Results indicated that there was no significant financial benefit for those who pursued an occupation related to their military training. This held even if they had desired the training prior to entry. Only those whose military occupation coincided with prior civilian jobs and who returned to their prior jobs had their income favorably affected. These were generally draftees and the benefits may largely be explained on the basis of prior occupation rather than the military. We have been concerned with the apparent absence of economic benefits from pursuing a career related to military occupation and the overriding tendency not to pursue this related trade.

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[1] Eugene L. Jurkowitz and Paul A. Weinstein, "The Military as a Trainer: A Study of Problems in Measuring Crossover," Proceedings of the Social Statistics Section, American Statistical Association, 1967, pp. 126-131.

The low level of transfer, we suspect, relates to two categories of phenomena. First, employers are constrained not to give special rewards for service experience. Their predilection as well as contractual restraints and job bidding suggest that longevity with an employer, rather than surrogate performance in the military, be the basis for skill. For the veteran, at least in the short run, income is maximized by returning to a former job. Coordinate to this is a hypothesis based on region which includes educational effects.

There are two possible lines of argument. The geographic origin of veterans suggests the options before service as well as the opportunities after service. We expect that the military is a possible preferential option for those who have inferior option sets. Thus, one is already aware that Negroes tend not only to enlist in larger numbers but have a much higher retention rate. We expected regional differences to surface when veterans are questioned about their pure enlistment status, as well as their interest in a specific military occupation at the time they entered the service. Specifically enlistment and military interest is inverse to the range of local economic opportunities. This suggests that rural areas send more volunteers into the service than urban areas.

The absence of educational opportunities, an alternative inducement to enlistment may also impede the productive application of the job experience. That is, an individual returning to a community that lacks the breadth of employment opportunities to utilize his militarily acquired skills. While the convergence of skill requirements, training, and operational duties between military and civilian occupations is noted in the aggregate, [2] there are grounds for assuming a priori a uneven spatial distribution of the demand for military skills. This aspect of the problem needs to be considered.

In addition to specific skills or job training which may have varying degrees of transferability, the military is assumed to invest in general human capital. We may think of this as the value of military life per se, or in terms of job externalities acquired through in-service experience. This investment varies by educational groups, the most notable aspect being that successful completion of military service fulfills the "certification effect" of high school completion for prior-to-service drop-outs.[3] Even when prior education and aptitude are explicitly included, the military still has a differential effect.

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[2] Albert D. Biderman and Laure M. Sharp, The Convergence of Military and Civilian Occupational Structures: Evidence From Studies of Military Retired Employment, American Journal of Sociology, Vol. 73, No. 4, January 1968.

[3] Paul A. Weinstein, "The Military as a Surrogate to Education," Paper delivered at Annual Meeting of American Psychological Association, San Francisco, September, 1968.

The military's effect may be viewed obliquely as a differential among those who have passed through it. The forgone opportunities stand as an almost insurmountable obstacle to assessing the absolute level of the military's effect. We observe three results from the military's investment in human capital: 1) Affecting the recipient's discounted earnings stream if and when the skill is transferred; 2) Altering the set of options for further training; or 3) Altering career patterns. Any may be positive or negative, for example if the foregone private investment and earnings exceed the military's. Strong evidence suggests that private, market-channeled general investment is not invariant to education and ability. We suggest that region independently alters the flow of specific and general human capital.

Section II. Quantitative Results

A. Education and the Military

The Military Training Study gathered data for this analysis from varied sources, including Army records as well as a directed interview with the veteran. The sample population included only non-career enlisted veterans in standby reserve, (less than six years active duty) for whom the military was either a break in their civilian career or a stepping stone to new civilian alternatives. The data encompasses pre-service, in-service (early 1960's), and post-military (three to six years from release from active duty) occupations and education as well as respondent determined motivation and associations.

The observations were grouped into the nine census divisions for analysis. Though other categories of regions may have a more rigorous basis as labor market or opportunity set indicators, these gross variables are known, available, and not without analytic merit to justify their use.

For each region, objective characteristics of the sample are shown via two dimensions in Table I. Both the level of education and mean G.T. scores indicate the quality of personnel from the regions.

The hypothesis that education and ability are positively correlated is tested by ranking these attributes from highest to lowest.[4] In fact, the two are highly correlated (r_s=.667) - but not perfectly so. Previous studies into regional differences in investment in human capacities emphasized quality differentials in education among region.[5] Our education variable implicitly assumes a unique unit relation between education and years of schooling completed. Hence, the correlate of aptitude is the demand for education, rather than quantity supplied.

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[4] Spearman's Rank Correlation Coefficient, r_s is employed to test relationships between various attributes of the regions. This provides for a test of the direction and significance of the correlation without assumptions concerning the function's linearities, or the distribution of the variables. The statistic ranges $-1 \leq r_s \leq 1$, with $r_s=0$ being random correlation [$r_s(.95)=\pm.600$]. Sidney Siegel, Nonparametric Statistics, (New York: McGraw-Hill, 1956), pp. 202-213.

The hypothesis that the propensity to volunteer for military service is inversely related to education remains moot. In Table IIA the percentage of volunteers are ranked by census division. Although an inverse relationship to education is indicated, we are not able to reject the null hypothesis that voluntarism and education are uncorrelated (r_s=-.167). A major factor here is that variations in reenlistment rates by regions are excluded. The weakness we believe is derived from the special character of the group, i.e. those who chose not to stay in service or on active reserve status. This group finds the civilian a preferred set to the military. Greater variance would appear if all who went from a region were studied. The enlistment and reenlistment rates by region are required to validate the hypothesis.

The scope of local alternatives sheds additional light upon regional variations in voluntarism. In Table IIB, three other regional variables are employed. The sample was categorized on three bases affixed to the county of residence prior to service: SMSA versus non-SMSA; urbanization of county, based on whether the county's proportion of urban dwellers was greater or less than the national average (69 percent); and the county's net migration status in the intercensal period 1950-1960. Assuming that urban and/or metropolitan areas offer a broader array of employment opportunities, our earlier hypothesis that the military broadens an individual's opportunity locus seems substantiated. For both the degree of urbanization and SMSA _vs_. non-SMSA dichotomies the null hypothesis that the groups came from identical populations is rejected at the .99 confidence level.[6] The smaller and more rural areas show higher rates of voluntarism as expected.

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[5] Rufus B. Hughes, Jr. "Interregional Income Differences: Self-Perpetuation," in Charles S. Benson, ed.; Perspectives on the Economics of Education, (Boston: Houghton Miflin, 1963), pp. 43-49.

Unfortunately no relationship is found between voluntarism and the growth or decline of the local area, our other proxy for opportunity. Perhaps reenlistments again obscure the correlation. Alternatively, net migration is not an appropriate indicator of the local economy's ability to offer satisfactory employment to the prospective veteran.

The relationship is far from uniform, but it is apparent that voluntarism is a function of the character of the localities, particularly their urban nature. This relationship is more meaningful than the inverse relationship of education to voluntarism.

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[6] All comparisons of dichotomous sample groups use the Chi square test with one degree of freedom.

Training and education open options for further training or education. This fact and the results of our correlation of aptitude on education turn our analysis to the impact of the military on post-service education. The experience of veterans having post-service schooling with the relative ranking of census divisions are in the right hand column of Table IIIA.

The military's effect is seen to be a "leveling" effect. The correlation among regions between ability and post-service education (r_s=.883) is clearer and more significant than for the pre-service education. We conclude that the improvement in this relation is a result of the military's impact. We assume that the quality of investment in individuals varies among regions (there is an educational disadvantage in coming from a region with bad schools). Military human capital is invariant to the origin of the recipient, as the military school and work system treats all alike. Hence, the leveling effect reduces pre-service regional differences, but the prior factors prevent a perfect correlate between education and aptitude.

It would be naive to posit that the "leveling" effect is the only factor influencing post-service education of veterans. For example, the percentage of veterans receiving additional education (Table IIIB) is significantly higher (at the .95 confidence level) for those from the urban localities. Examination of the SMSA vs. Non-SMSA dichotomy leads to the same results.

Part of this difference may be explained from "tastes" reflecting the consumption aspect of education. However, other factors appear to enter, even if the demand for education is assumed invariant to locality. The observed phenomenon may be caused by the clustering of educational institutions in metropolitan areas. Thus the supply curve of educational facilities in metropolitan regions has a higher elasticity and lies below the educational supply function in non-metropolitan areas.

An additional difficulty affecting any definitive statement is that the mean level of ability for veterans in SMSA's ($\overline{G.T.}$=110.6) is significantly greater than for their out-of-town counterparts ($\overline{G.T.}$=106.0).

B. Vocations and the Military

The military can serve as a first step on a career ladder or a vehicle for elevation on the ladder. Examine the relation between post-service education and the preference for a specific duty or training at entry in the Army by each region. It is found to be positive and significant (r_s=.667). Despite this, we suspect that region enters here only obliquely. Rather, economic theory suggests that those who are forward planners at the time of service entry are likely to retain that trait in their post-military career. Those who sought to maximize the value of military life (or perhaps minimize the negative aspects of it) also attempt to maximize their post-service quasi-rents via education.

Another domain of the military's impact can be seen from an analysis of veterans who attempted to complete occupational crossover. A rank correlation between voluntarism and the percentage of veterans who sought a post-service job similar to their military duties and/or training (see Table IVA) reveals a positive and significant (r_s=.667) relationship. This supports our hypothesis that individuals from regions where they have lower opportunities to receive adequate civilian training may view the military as a good provider of training and career options. Here, the reenlistment variation by region does not obscure the relationship. The observations are for voluntarism excluding a military career, where the object is capitalizing upon the Army's investment in a post-service vocation.

The average degree of military skill utilization in each region was measured by constructing an index of occupational crossover (Table V). As expected, this index is highly correlated (r_s=.783) with the percentage of veterans in each region who sought a related civilian job. A deeper insight is available in Tables IVB and VB. No significant differences occur dependent on either the degree of urbanization or the SMSA vs. Non-SMSA dichotomies. A significantly greater proportion of those who located in growing areas attempted to complete crossover than those who settled in counties suffering a net loss via migration.

There are two distinct explanations for higher interest and success in growing areas. First, the veteran may seek regions experiencing labor shortages. While it has been noted that employers prefer hiring unskilled and promoting from within, the buoyancy of the market may be to the advantage of those who are semi-finished workers, though lacking civilian experience. Also, it may be that these localities are those with a higher state of occupational convergence *ex ante*, as well as *ex post*.

Conclusion

The military's direct manpower effect is spread unevenly across the country. As a consequence, the manpower pools available to local areas are more alike, with the military having partially cancelled out regional differences. While the input into the military is disparate, the military production function homogenizes if not pasteurizes the output. For some regions the amount of general human capital available is enhanced, while for others the supply of specific capital is augmented. There is considerable variance among regions in the specific capital effect of the military, and this requires increased research to realize the military's civilian potentials.

This analysis only peeled the first layer of what we believe is a fruit ripe for picking. To aid communities use these manpower resources, as well as to help veterans realize some economic advantages, a more highly directed micro-analytic program of research is in order. For example, Clatanoff is applying regression analysis using variables of more theoretical interest, such as industry mix. We believe there will be fruitful results from such efforts, and no one need worry about a preempted field.

Policy implications can be discerned even from these meager results. For example, altering military manpower procurement policy to purely monetary incentives would change geographic composition of the armed forces. Rural areas would be more highly represented with the military siphoning off the able youth from these regions, or reducing the population problem in rural America. A volunteer army would probably reduce crossover, a function of the lower utilization rates in rural areas. Only if geographical mobility were increased would this result not hold.

Either a piecemeal or major demobilization would make available stocks of human capital to areas with varying digestive ability for this manna. To effectively aid crossover appropriate counselling to employers as well as servicemen is in order. For the latter it is important, though politically chancey, to let servicemen know that their economic prospects will be enhanced in certain types of communities. Intensive counselling should be done in service, and while this has a tendency to cause dyspepsia in the military, efficient manpower utilization suggests that old prejudices be dispelled. While legitimate military interests need be considered, the social use of the public sector requires the military's open cooperation.

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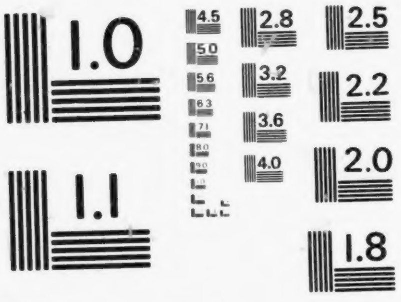
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

TABLE I

PRE-SERVICE ATTRIBUTES OF THE SAMPLE

	Region	N	Pre-Service Education	U.S. Rank	G.T. Score	U.S. Rank
I.	New England	94	5.032*	8	108.80*	5
	Maine		1.726*		20.11*	
	Vermont					
	New Hampshire					
	Connecticut					
	Massachusetts					
	Rhode Island					
II.	Middle Atlantic	503	5.272	4	111.70	2
	New York		1.710		16.48	
	New Jersey					
	Pennsylvania					
III.	South Atlantic	139	5.036	7	106.14	8
	Maryland		1.717		17.80	
	Delaware					
	District of Columbia					
	Virginia					
	West Virginia					
	North Carolina					
	South Carolina					
	Georgia					
	Florida					
IV.	East South Central	63	4.984	9	105.00	9
	Kentucky		1.518		17.22	
	Tennessee					
	Mississippi					
	Alabama					
V.	West South Central	108	5.250	5	106.29	7
	Oklahoma		1.547		19.13	
	Arkansas					
	Louisiana					
	Texas					
VI.	Pacific	128	5.765	1	112.28	1
	Washington		1.772		18.96	
	Oregon					
	California					

8

Table I, continued

		N	Pre-Service Education		G.T. Score	
VII.	Mountain	38	5.658	2	109.13	4
	New Mexico		1.921		20.80	
	Arizona					
	Colorado					
	Utah					
	Nevada					
	Wyoming					
	Idaho					
	Montana					
VIII.	West North Central	147	5.292	3	108.49	6
	North Dakota		1.697		15.14	
	South Dakota					
	Nebraska					
	Minnesota					
	Iowa					
	Kansas					
	Missouri					
IX.	East North Central	451	5.122	6	110.63	3
	Wisconsin		1.708		18.98	
	Michigan					
	Illinois					
	Indiana					
	Ohio					
	Total Sample	1,671	5.235		109.89	
			1.710		18.02	

*Mean on top, Standard Deviation underneath.

Note: The Education variable is coded as follows:

1 = 8 years or less of education
2 = 9 years of education
3 = 10 years of education
4 = 11 years of education
5 = High School graduate
6 = 1 year of College
7 = 2 years of College
8 = 3 years of College
9 = College Graduate
10 = Post Graduate Work

G.T. is an Army, combined arithmetic-verbal test of aptitude administered at the time of service entrance, with a mean of 100, and a standard deviation of 12.

TABLE II VOLUNTARISM BY REGION OF ORIGIN

A.

Region	Volunteer*	Non-volunteer	Volunteers as a % of total	Rank
I. New England	33	61	35.1	2
II. Middle Atlantic	120	383	23.9	6
III. South Atlantic	39	100	28.0	4
IV. East South Central	14	49	22.2	8
V. West South Central	34	74	31.4	3
VI. Pacific	29	99	22.7	7
VII. Mountain	14	24	36.8	1
VIII. West North Central	37	110	25.2	5
IX. East North Central	91	360	20.2	9
Total Sample		1260	24.6	

B.

County of Residence Prior to Service	Volunteer *	Non-volunteer	Volunteers as a % of total
Greater than 69% urban	283	958	22.8
Less than 69% urban	128	300	29.9
SMSA	278	964	22.4
Non-SMSA	139	315	30.6
Net Gain via Migration	222	644	25.6
Net Loss via Migration	189	614	23.5

*As used throughout this paper, a "volunteer" is either an enlistee or inductee who would have entered the service in the absence of the military draft.

TABLE III JOB PREFERENCE and POST-SERVICE EDUCATION

A.

Region		Had a Job or Training Preference at Time of Service Entrance		Have Had Post-Service Schooling *	
		%	Rank	%	Rank
I.	New England	61.7	1	44.6	3
II.	Middle Atlantic	53.7	5	46.3	2
III.	South Atlantic	54.0	4	38.1	7
IV.	East South Central	39.7	9	28.6	9
V.	West South Central	55.6	3	39.8	6
VI.	Pacific	59.3	2	57.0	1
VII.	Mountain	52.6	6	42.1	4
VIII.	West North Central	46.3	8	34.0	8
IX.	East North Central	49.2	7	41.4	5
	TOTAL SAMPLE	52.3		42.8	

B.

County of Residence	Have Had Post-Service Schooling*	No Post-Service Schooling	Those With School as a % of Total
Greater than 69% urban	578	663	46.5
Less than 69% urban	138	290	32.2
SMSA	577	665	46.5
Non-SMSA	142	312	31.3
Net Gain via Migration	394	472	45.5
Net Loss via Migration	322	481	40.1

*Schooling includes full and part time class work as well as correspondence courses, but does not include on-the-job training.

TABLE IV ATTEMPTS AT OCCUPATIONAL CROSSOVER

A.

Region		Looked for a Post-Service Job Similar to Military Duties and/or Training	
		%	Rank
I.	New England	39.3	2
II.	Middle Atlantic	33.2	3
III.	South Atlantic	29.5	8
IV.	East South Central	28.6	9
V.	West South Central	30.6	5
VI.	Pacific	29.7	7
VII.	Mountain	50.0	1
VIII.	West North Central	32.0	4
IX.	East North Central	29.9	6
	TOTAL SAMPLE	32.0	

B.

County of Residence	Veterans Who Looked for a Job Similar to Military Duties and/or Training	Did Not Attempt Occupational Crossover	Those Who Looked As a % of Total
Greater than 69% urban	408	833	32.9%
Less than 69% urban	127	301	29.7%
SMSA	388	854	31.2%
Non-SMSA	143	311	31.5%
Net Gain via Migration	296	507	34.2%
Net Loss via Migration	239	564	29.7%

TABLE V OCCUPATIONAL CROSSOVER OF VETERANS

A.

Region		Index of Occupational Crossover		
		Mean	Standard Deviation	Rank
I.	New England	1.487	(.671)	1
II.	Middle Atlantic	1.396	(.594)	4
III.	South Atlantic	1.306	(.542)	8
IV.	East South Central	1.296	(.539)	9
V.	West Central	1.433	(.597)	2
VI.	Pacific	1.361	(.570)	6
VII.	Mountain	1.397	(.540)	3
VIII.	West North Central	1.355	(.539)	7
IX.	East North Central	1.384	(.613)	5
	TOTAL SAMPLE	1.383	(.5906)	

B.

County of Residence	Index of Occupational Crossover	
	Mean	Standard Deviation
Greater than 69% urban	1.400	(.608)
Less than 69% urban	1.335	(.534)
SMSA	1.406	(.613)
Non-SMSA	1.342	(.555)
Net Gain via Migration	1.390	(.594)
Net Loss via Migration	1.376	(.586)

Footnote to Table V.

*This index was constructed from the following question which was asked for each post-service job held by the veteran: "How similar was your work as a (JOB TITLE) to any training or experience that you had in the service...?"

For each of the *i* jobs held, the response r_i was coded:

Very Similar	$r_i=3$
Somewhat Similar	$r_i=2$
Not at all Similar	$r_i=1$

Letting m_i equal the number of months worked at the i^{th} job, so that $\sum m_i$ equals the total time in jobs covered by the questionnaire, our index is thus:

$$\text{Index} = \frac{\sum r_i m_i}{\sum m_i}$$

This variable then may be seen to have a value between 1 and 3 for each observation, with the higher values indicating greater occupational crossover.